

SOUTHERN AND SWISS  
HEALTH RESORTS

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SOUTHERN AND SWISS  
HEALTH RESORTS



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THE PRINCIPAL  
SOUTHERN AND SWISS  
HEALTH RESORTS

THEIR

CLIMATE AND MEDICAL ASPECT

BY

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## PREFACE

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ON my return to London, after spending three winter seasons at Nice and six at Cannes, engaged in medical practice, it occurred to me that the experience I had acquired of the influence of southern climates on invalids might form the main subject of a book not altogether wanting in medical and public utility. A visit to Madeira and the Canary Islands afforded me an opportunity of inquiring into the character of these stations as health resorts, while a long acquaintance with many of the places in Switzerland, patronised by invalids in search of health, has enabled me to include them also in the present work. The Village of Davos, situated in one of the highest Swiss valleys, has earned for itself a well-deserved reputation as a winter sanitarium for the treatment of consumption, and an account of this station will be found in the following pages.

While wintering on the Riviera I made careful observations of the weather, temperature of the air,

etc., with reference to their influence on invalids; hence the reason of my having dwelt upon the climate of the Mediterranean Coast at a somewhat greater length than might perhaps have been expected.

The short and decisive Egyptian war of last autumn is likely to keep back this winter the usual stream of visitors to Cairo and the Nile, but it will not be long before Egypt again welcomes her visitors and offers them a residence as quiet and secure as any of the most favoured health resorts.

39, GROSVENOR STREET, W.

1883.

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# THE PRINCIPAL SOUTHERN HEALTH RESORTS

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## CHAPTER I .

### ADVICE TO INVALIDS ABOUT TO WINTER ON THE RIVIERA— DRESS AND FOOD

Most invalids, on being made aware of the necessity of going south for the winter, are anything but pleased. People generally, under a circumstance of this kind, are inclined to think their case a very hard one indeed, and will not fail to bring every possible argument to bear against such a decision. The fact of leaving home with perhaps a large establishment, of trusting children to servants or governesses, of giving up for a long winter those many associations often looked upon as the main pleasure of life, seems a great deal to submit to for the sake of health. The subject thereupon becomes one of a lively debate. Could not the same result be obtained without going so far? The expense, the inconvenience, the want of knowledge of the language, the fatigue from travelling, the lack of company, not only during the journey but abroad,

and a thousand other reasons, equally good, are given against moving. The doctor is now obliged to bring some little pressure to bear, and will finally express his opinion clearly and positively that he is certain nothing short of wintering in a mild climate will be available to arrest the course of the illness, which bids fair to take a very serious aspect unless this measure be adopted. A meeting with a consulting physician is not unlikely to follow, when such places as Hastings, Brighton, Torquay, and Bournemouth, will be considered for the third or fourth time ; but we will take it for granted that so much uncertainty and discussion has finally led to the conviction of the necessity of cheating an English winter of its cold winds and rains, its fogs and snow-storms, and of seeking the mild, genial climate of the south.

The next question to be settled is where to go to. There are Hyères, Cannes, Nice, Mentone, San Remo, or Bordighiera. Perhaps Egypt would do best, or Algiers, or it might be that Madeira or the Canary Islands would after all be the right place to spend the winter. These different resorts are therefore talked over one after the other, the medical adviser giving the result of his knowledge and experience ; while the patient argues from what he or she has read on the subject, and often grounds an opinion on the circumstance that this or that friend has either derived much benefit, or none at all, from wintering in any special southern station. Hyères will be thought very windy and in want of good shops and comfort in some

respects. Cannes is too crowded, and said to be somewhat expensive. Nice is too much a place of pleasure and too near Monaco and its gambling establishment to be safe for young men; it is, moreover, a large town of fifty-five thousand inhabitants, and quite clashes with the idea of a rural life and its pleasant free mode of existence. Mentone or San Remo will be thought too relaxing, and as to Egypt, it is terribly far off, the sea voyage is very long, the climate too dry, and vegetation, except on the borders of the Nile, must be deficient in the realm of sand and dust. It is true that a voyage up the Nile in a dahabeah would be charming, but then there is the absence of medical advice in case of need, and the expense is very great. But what about Algeria; the sea voyage only takes about forty hours, and the fine steamers of the "Compagnie Générale Transatlantique" have commenced plying twice a week from Marseilles to Algiers. Oh! but Algeria would do no better; the accounts of its climate vary so much, and a French physician of repute writes that he derived no benefit to his health from spending a winter there. Then the sirocco is a frightfully hot wind, loaded with dust from the desert, which, drying up everything, makes one feel miserable. There are, moreover, fewer English at Algiers than in the health resorts of the Riviera, and it looks a lonely place.

Surely if no such resorts will do, Madeira or Teneriffe may offer the desired requirements; but no, certainly not, they will answer no better, the thoughts of

sea sickness during three or four days is too dreadful to be contemplated ; it is true that there are the splendid steamers of the Donald Currie Line and those of the Union Line bound for the Cape and calling at Madeira, which unite every possible comfort save that of insuring against the effects of the rolling waves. From Madeira, if you do not care to stay there, the steamers of the African Mail Company will take you on to Teneriffe. Madeira, however, is said to be damp in winter and to exert a relaxing influence, while a bracing effect is desired. Again, Madeira used to be considered an excellent place to go to years ago, but comparatively few go there now. As for Teneriffe, it would feel like being in a desert island, so little vegetation, so few English, and people, perhaps, who would not care to welcome invalids, so we conclude that neither Madeira nor Teneriffe will answer.

The above remarks are made by invalids who have but a superficial knowledge of the winter resorts of the south ; they think they know a great deal about them, but if they only had the experience gained after spending some winters on these stations, they would express their opinion in a very different way.

Let us conclude that after a full review of the different health resorts, the Riviera has been at last settled upon, and that Cannes is the destination contemplated. The next question to be considered is the right time for leaving. This must vary according to the nature of the case and the weather at

home. It will not do to arrive too early, as the heat is still too great, and I should not recommend anybody to reach the Mediterranean coast before the end of October. Most people come out during the month of November, and many wait till they are driven out of England by foggy and cold weather. In October, especially in the early part of the month, vegetation on the Riviera is wanting and the gardens look wretched at that time of the year; there are no flowers to greet the eye, no green grass is seen suggesting an English lawn, the scent of the orange blossom and cassia does not pervade the air, the leaves of the olive tree look dull and drooping, everything growing is either thirsty or dried up after six months of a nearly continued drought. Indeed, where grass ought to be, there lays a thick coat of straw, the remnants of manure spread over the soil. This habit is derived, I presume, from an idea that the soil is poor, but I am inclined to think that the manure does not act so much by supplying material for the growth of the grass as by retaining the enormous quantity of summer heat absorbed by the ground and preventing the rapid evaporation of the moisture after the early autumn rain. It follows that as soon as rain falls the seeds sown under the straw germinate and grow with much vigour. Then in the early part of the season, especially in October, the mosquitoes are very wild and active, and they appear particularly fond of annoying new comers. Young people with tender skins may be seen after

a few days with their faces covered with small red pimples from the bites of these vicious insects, but the first cool nights in December put an end to their voracious disposition. It is easy, moreover, to escape them altogether by killing them off inside the curtains of the bed before turning in, care being taken not to leave a single one behind, or it will prove a dreadful tormentor. Excellent mosquito preservers are made of whalebone or light wooden hoops with tulle fastened to them. The head is slipped into this bag at night, and holds the hoops with the side up by resting upon them. The long tube of tulle through which the head has been introduced effectually protects the face and neck, while the hoops prevent the tulle from coming in contact with the face. Another arrangement is to have semi-circular hoops made of light flat iron bands, joined by cross-pieces of wood, and between two or three feet high. Two ends of the hoops are slipped under the mattress, while the other ends project forward, and under these the head is placed at night; a piece of tulle, of about two yards in length and one in breadth thrown over the hoops effectually protects the head and upper part of the body; this arrangement I have found to answer very well.

As to the hotels, they open about the 15th of October, and even then many are not yet quite ready for the season; the waiters may not have been all engaged, and perhaps the food is not as good and plentiful as when the season has fairly set in.



Numbers of invalids are met with arriving on the Riviera throughout the whole winter. Some who never expected to have to migrate to the Mediterranean shores have fallen ill with a very bad cold in November, and after trying all sorts of means to get rid of it come out some time in December.

We may now suppose the time to make a start is drawing near, and arrangements for the departure have to be made. I wish to premise that nothing to my mind is so miserable as a single lady travelling by herself, and spending the winter abroad without a companion. She will find it often difficult to make friends in an hotel, and I have seen many so situated live a monotonous, dull, and solitary existence. Some, it is true, do not mind such prospects, but they must recollect that loneliness is felt much more in a foreign country than at home; they have to live with people speaking another language, and to adopt a mode of existence in many respects different to what they have been accustomed. Then the hotel and boarding-house arrangements have to be submitted to, and often clash with one's own tastes and habits. There are, moreover, comparatively few amusements for invalids in these health resorts, and they are often mostly dependent upon one another for much of what is pleasant in life, and helps to pass the time. It is not easy, however, to suggest what single ladies had better do for a companion, and they will find many a way of solving the difficulty without a hint from me; there is one thing, however, important to bear in

mind, that is, the necessity of being very careful should they think of engaging a lady companion. No doubt but that such an arrangement may lead to the spending of a very pleasant winter, and a lady companion of true, genuine, and high feelings, kindly disposed, and well informed, will often be all that can be wished for. Under such conditions a mutual esteem and attachment will probably soon occur, and life abroad will be smooth and happy. Not so, however, in some cases; characters may not be found to suit, too much may be expected from the lady companion; her position, which is not well defined, may, if she is not gifted with great resolution and self-possession, lead to a feeling of discontent on her part, she may wish to be alone when her society is wanted, or prefer reading rather than conversing, she may not care to drive out when asked to do so, or be fond of arguing, or appear to be trying to obtain influence. Her favourite subjects for conversation may not be the same as that of the lady in whose companionship she is living, she may be thought too forward in her character, perhaps too fond of dress, and a thousand other circumstances can lead to an uncomfortable existence for both parties. After nine winters of medical experience of the south, three of which were passed at Nice and six at Cannes, I have had many opportunities of meeting single ladies wintering abroad with a lady companion, and I cannot insist too strongly on the importance of exercising great care and discrimination in the selec-



tion of such kinds of companionship ; of course the secret for a happy and peaceful existence under such circumstances will be a mutual regard and consideration, a reciprocal feeling of good fellowship, and the desire to make each other pleased and comfortable.

Let us suppose what happens, perhaps, in the majority of cases ; the invalid is a lady with a family of young children, it is arranged that the husband, who is a man engaged in business in England, will accompany his wife and children to the South of France, see them comfortably settled there for the winter and then return home to his work. It will be asked, of course, how will the climate agree with the children. They have been in the habit of wintering in a cold, damp country, and are in excellent health, may not the Riviera with its mild and soft weather prove debilitating to their young frames ? Can they become acclimatised like people of more mature age ? To this I unhesitatingly answer that healthy children as a rule do very well on the Riviera, although my experience leads me to believe that both children and grown up people in good health who spend many winters in succession in one of the southern stations, become accustomed to rely on the sun for a portion of the heat their body requires ; the power of generating heat within themselves becomes thereby somewhat lessened, in consequence of which they feel the cold much more than they would have done before. One is especially conscious of this lessened power of gene-

rating heat, or of reaction against cold, when bathing in cold water. The sea at Brighton or St. Leonard's does not feel particularly cold year after year to most bathers in August and September, some find it even warm. The Mediterranean at Cannes feels quite warm and pleasant in October, and is indeed, as far as its temperature is concerned, comfortable throughout the greater part of the winter to many used to bathing in the Atlantic. Should circumstances, however, bring back a healthy person to southern haunts winter after winter, bathing in the Mediterranean will appear colder and colder; by degrees the November dip will be given up, and even in October the water will begin to feel surprisingly cool. This is the result of my own experience, and I believe it will be the same with most people. Again, nobody after a residence of one or several winters on the Riviera will think of going about without much the same kind of clothing as they would use at home; if the sun is hot, as is often the case in January and February, a great coat is carried under the arm ready to wear on the earliest sensation of cold; while ladies out driving have extra shawls and cloaks, which are sure to come into requisition some time before sunset, and frequently in the middle of the day.

Children and grown up people in good health, after spending a number of winter seasons in succession in the south, are disposed to lose temporarily some of their stamina and bodily power; they do not become subject to certain complaints, such as affections of

the liver or spleen so common in India, but they will have less energy, and mental work will be found more laborious than at home. It is surprising, however, how soon the body recovers its strength after spending one or two winters in England. I have often been asked, even by people in good health, whether after wintering in the south during several seasons in succession there was much risk to health to spend the winter in England; my answer has always been in the negative, but it will be necessary to guard carefully against cold the first or the first and second winter after returning home.

The use of the cold tub every morning is one of the best means of keeping up one's bodily strength in the south. Walking exercise in the open air is also available towards that object, and there is no want of walks on the Mediterranean stations, affording beautiful views of the hills and sea coast and lovely sunsets. Nothing can be more charming than the chain of the Esterel mountains as seen from the Croix des Gardes, and the bay dotted with boats, with the town of Cannes at one's feet; while should the sun be setting, the contrast between the dark shades of evening on the hills in the west, and the Islands of Ste Marguerite and St Honorat lighted up by the setting sun, will greatly add to the beauty of the view. There are walks through forests of lofty pines, over rocky hills where the cork tree grows, and along dark glens the abode of ivy, ferns, and the winding twigs of the wild asparagus. There also the rosy fruit of the

arbutus will be gathered ripe in autumn. Pedestrians will find hills rising over 2000 feet above the sea, and affording objects for a day's excursion. The botanist will be in no want of plants and flowers to collect, as shown by Mr. Moggerridge's beautiful work on the 'Flora of Mentone,' and Dr. Henry Bennet's botanical notes and remarks in his excellent book on the 'Winter and Spring on the Shores of the Mediterranean.' Excursions can be taken with a drawing book in hand, and time thus utilised in a variety of ways consistent with exercise in the open air.

The maintenance of health, in a southern station, for a person in the full enjoyment of it, cannot and should not be left to chance or good luck, as is usually done at home. I believe that the constant employment in the busy and active life people lead in England—and I allude to both gentlemen and ladies—helps greatly to keep them in good health so long as they do not overdo it. The captivating interest people take in their every day's occupation is usually of a most healthy nature, while its absence is often the source of much anxiety and distress. How few people are not at times haunted by the recollection of sad and trying events, pining for peace to the body and mind, and who only succeed in keeping such ceaseless sources of anguish at bay by constant and engrossing labour. Looking at this subject from another point of view, one of a more scientific character, the combustion ever at work in the living body giving rise to the production of

the same gas as the burning of wood or coals—carbonic acid—is very much increased not only by exercise, but by occupation of every kind, the greatest quantity, however, resulting from muscular exertion. Now, this formation of carbonic acid may be called the main function of life ; we make least when asleep or when our vital powers are at their lowest ebb ; we make most when vigorously employed and in the enjoyment of perfect health ; while running the combustion in the body is no less than about four or five times as great as when sitting ; it is greater when under the influence of food than when weakened by fasting, indeed, the amount of carbonic acid which is given out by breathing may be considered to a certain extent as a sign of the strength of a person's constitution. If a gentleman, lady or child, accustomed to active habits at home, should be wintered on the Riviera, either for enjoyment or as companion to an invalid, unless they find some employment for their time they will soon begin to burn less in their body than they did at home, and therefore create less heat within themselves. The warm sun will give them the heat they do not make, and they will become lazy and unwilling to exert themselves, all their functions thereby losing more or less energy. Hence their general state of health becomes either somewhat weakened or impaired.

*Dress.*—It is often asked before going south, what dress shall we take consistently with the climate ? If we are to expect it to be very warm there is no use to

bring out heavy dresses; wraps, shawls and cloaks are all very well at home and for railway travelling, but nothing of the kind will be required under the blue sky and delightful bright sun of the Mediterranean shores. Thus many ladies argue, and let me tell them they are quite mistaken; not that the warm and pleasant sensation attending clear and bright weather is a delusion and a snare, but the changes of temperature are very sudden, and the contrast from warm to cold is so great that in many cases it cannot be borne with impunity. Children are particularly sensitive to these sudden changes, and I have often been called upon to attend cases of slight feverish attacks or sore throat among young people who, while playing out of doors, had gone from a sunny spot into the cold shade of a house; or who had inadvertently stayed out at sunset without putting on extra clothing.

Persons in good health, though suffering at times from rheumatic pains, may, from a circumstance of this kind, be visited with a return of their old enemy, or what is commonly known as a cold may follow on imprudence of a similar nature. Winter clothing ought, therefore, to be always taken out to the south, but should be made of a light and close texture, lighter indeed in weight than that worn at home, but of a tighter woven material. Furs and sealskins are useful for driving, but cloaks made of thick cloth are too heavy; velvet is somewhat objectionable on account of the dusty roads. Silk being a very bad conductor



of heat, is a warm and light material to wear ; it is surprising how much heat will be given by a silk shawl thrown over a bed at night, although its weight is quite imperceptible, while the reverse will be experienced from a cotton counterpane, about the most objectionable and unsatisfactory bed covering. Ladies should recollect that the sun is very powerful, and that hats should be light and broad in the brim, while parasols should not be forgotten.

*Food.*—The food in the hotels and boarding-houses of the French and Italian health resorts along the Mediterranean coast is as a rule good and plentiful. Meat is of good quality ; beef-steaks are (as usually in France) beaten into a soft and tender state. The cooking is French, and the tables-d'hôte are supplied with a large variety of dishes. I have often heard complaints as to the scarcity of good honest joints at table-d'hôte, not that the food is deficient in quality or quantity, but it is too much “made up” for the English palate, and somewhat too uniform of its kind. An English bill of fare, short and substantial, would be, I should think, the most wholesome of the two. A leg of mutton is rather smaller at Cannes than in London, and perhaps not quite equal to it in flavour, beef is good although hardly as tasty or juicy as it is in England. The oxen are mostly procured from Piedmont, and droves of fine cattle in excellent condition and with well-developed horns towering over their large heads, are often seen of an evening arriving in town. There is at

Cannes an excellent municipal law ensuring the quality of the meat served to strangers. Slaughtered cattle cannot be offered for sale until it has been examined by a veterinary surgeon appointed for that purpose. A shed has been erected near the seaside, close to the "Batterie St Pierre," enclosing an office where the inspector sits at a desk to write out his report, and a row of hooks are disposed along the wall, on which the carcasses are hung up opened and ready for inspection. I once had an opportunity of witnessing the process. The carcasses were all looked into by the inspector, one after the other, and it appeared to me that no defect, either from disease or decomposition, could escape him. Meat is thus examined twice a day, once in the course of two or three hours early in the morning, and again late in the afternoon, thus saving the public as much as possible from the unsightly view of a number of carts loaded with dead meat driven through the town. Poultry and game are abundant. Chickens are in general in excellent condition, young and tender, although an old cock may appear on the table as by accident; but towards the month of May, when people begin to leave Cannes, it is obvious that there is a falling off in the quality of the food, and chickens become leaner, older, and tougher. Fowl under every imaginable form is the staple table-d'hôte dish, and it is hinted after a time that, as with salmon in Scotland, there has been enough of it. Game can be had very good and at a reasonable price. Partridges and woodcocks cost from



2 francs 50 cents. to 3 francs 50 cents.; wild ducks 3 to 4 francs; hares are worth 7 or 8 francs; wild rabbits 3 francs to 3 francs 50 cents. Pheasants are much more expensive, and cost about 10 francs each. These are the prices at the height of the game season only, that is, from October till the end of January, but game can be had somewhat later by paying more for it.

*Fish.\**—Mediterranean fish is abundant, although hardly so good as that from the Atlantic. I would not make this, however, too sweeping an assertion, and whiting is certainly an exception to the rule. The Mediterranean whiting is an excellent fish, it is often of a larger size than that from the Atlantic, and when fresh is quite equal to it, if not still more delicate in flavour. A fish occasionally met with in the fresh condition in the spring is the tunny. It is taken along the Mediterranean coast in nets spread horizontally and raised at the edges as the shoal passes, the enclosed fish are then slaughtered. The tunny is usually six feet in length, its taste is excellent when fresh; it is well known in France and England preserved in oil. Sardines and anchovies are also often procured fresh, but I question whether they will be found quite as good as those preserved in tin boxes, at all events their taste is certainly not exactly the same. The “bar” or “loup,” because of its voracious habits, is a fish bearing some resemblance to the perch, and often seen at table d’hôte;

\* For a list of the principal Mediterranean fishes, see the vol. on ‘The Mediterranean,’ by Rear Admiral William Henry Smyth.

it has a fine white and firm flesh, and looks all that could be wished for, but the expectation is rather disappointed on tasting. The dorade\* is said to be possessed of a very good taste, although one soon gets tired of it. The mullet, of which there are four varieties in the Mediterranean, is frequently eaten. The rascasse or "scorpene" has a large head, and soft loose skin falling about in folds of a reddish colour, which gives the fish a peculiarly hideous look. Either that fish or the "loup" enters into the composition of the "bouillabaisse," so grateful to the palate of the native of the Provence. This dainty dish also contains other fish of a smaller description cut up into pieces, garlic, onion, parsley, laurel, fennel, saffron, slices of tomato, olive oil, and plenty of pepper, the whole being boiled with water and slices of bread. Although turbot, soles and mackerel are on Admiral Smyth's list of Mediterranean fishes in his book on 'The Mediterranean,' still I believe those to be had on the Riviera are mostly sent from Paris.

There are all sorts of small fry sold cheap to the local inhabitants, but which never find their way to the visitors' table. They can be seen with their bright colours and glittering silver backs struggling in the fishermen's nets, and a very pretty and picturesque sight it is to watch the large nets drawn high and dry at each end by two parties of seven or eight

\* The dorade has a blade-shaped body, and belongs to the same family as the ornamental gold-fish. The colour of the Mediterranean dorade is silvery-blue; it is taken in autumn and spring along the coast while spawning.

fishermen ; there are frequently crowds of strangers on the spot, and eyes are eagerly strained as the bag ending the net reaches the shore, but every haul is far from being a wonderful one. To the uninitiated, the contents of the net will be indeed of much interest, but after a time that kind of sport loses some of its attraction.

Fishing, or rather fish spearing, is carried on at night, and is most interesting to watch when taking a walk along the seaside at Cannes on the lovely winter evenings. It frequently happens that one or more bright red lights are seen on the water, moving slowly along the shore, and rising and falling under that invisible undulation seldom absent from the Mediterranean Sea even in the calmest nights ; or perhaps while sitting in one's drawing room in a villa or hotel near the sea, a sudden glare through the shutters will reveal a most unexpected and novel sight. What, indeed, can be that very bright light ! the shutters are thrown open, and then a small boat may be seen in a flood of red light, mounted by two or three men, with faces crimson coloured from the glare of a bright fire of coal and bituminous pine wood. A grate or metal basket is fixed to the stem of the boat and overhangs the sea ; it is one mass of light, the flames of the ignited wood rising high above the occupants of the skiff. Presently one of the men thrusts the end of a stick into the burning mass ; he uses it as a poker, and then follows a shower of glittering sparks. The fishermen may now be seen intent on their pursuit ; each of them holds the handle of a long spear in the right

hand, looking eagerly over the bows of the boat and apparently in the act of striking ; the picture, with its wonderful contrasts of light and shade, is worth a Rembrandt. Suddenly the hand is brought down vigorously with a sudden stoop of the body, again it is withdrawn, and in the light of the brazier a fish is seen glittering and struggling on the prongs of the merciless weapon ; another second and the fish wriggles in the boat, while the fisherman prepares to strike again.

I had an opportunity on two occasions of witnessing this kind of fishing together with the fishermen and in their own boat ; the first time nothing was taken, but the second was attended with success. This was one evening in January. I was taking a solitary walk along the harbour about nine o'clock on a lovely night, and watching the long lines of the silvery ripple as it broke in a tiny wave along the shore full in the white light of the moon ; when a boat with three men engaged in fish spearing shot round the pier-head, and was soon passing by, moving noiselessly onwards. The opportunity appeared too good to be lost, and I hailed the boatman who acceded at once to my request of being taken on board to witness their work. The pine wood was burning brightly, and the glare was such that the sandy bottom of the sea was distinctly visible at three or four feet deep ; any object in the water within the lighted space could be seen most clearly, I should say better than in the daytime. There were several fish in the boat, and the prospects appeared good for

sport. One man rowed on very slowly, with regular strokes, keeping about thirty to sixty yards from the shore, the others held their long spears with their body bent forwards, and taking in at a glance the different parts of the water lighted up on their side of the boat. Several fish appeared in succession, but too far for a thrust; suddenly down went one of the spears, and a fish which had escaped my notice altogether, was hauled into the boat. I soon found that these men have a wonderful eye for the detection of their prey, which mostly swim close to the sandy bottom. This sport requires not only a keen eye, but a hand practised in the striking, as from the refraction of the water the fish is really not exactly at the spot in which it is seen. While looking into the water I saw in the glare of the brazier a most beautiful living object, in the shape of a long worm, passing rapidly under the boat, and apparently propelling its body by means of a row of cilia-looking appendages. It had, if I mistake not, a bright blue and red colour in the light of the fire, and disappeared quickly from my view.\* After a time a rather large prize fell to one of the spears; the fish was rounded and somewhat flattened, with a very short tail. I did not recognise it at first in the darkness, but attempted to lay hold of it to take it to the light. As soon as I touched it I was startled by receiving a powerful electric discharge like that from a Leyden jar, and which sufficed, of course, to reveal the name of the animal, which was the well-known torpedo,

\* The leodice, an Annelid of the Nereid family.

a fish of the Ray family. The shock I received drove me back to the great amusement of the boatmen, and one of them asked me if I knew how to touch the fish without being hurt; I was going to answer by laying hold of it with a silk handkerchief, but he rejoined "Why, it is the easiest thing in the world, only bite your left-hand index finger hard and then you will feel nothing on touching the fish with the right hand." Of course I replied, but I declined to try the experiment, preferring not to give them another opportunity of laughing at my expense. I could not make out whether this was said jestingly or not, but these fishermen appeared to believe that by adopting such a precaution no shock is felt on touching the torpedo. Although the poor animal was severely wounded from the prongs of the spear, it continued alive, remaining very quiet, and twenty minutes afterwards, and even later, appeared to have lost none of its vitality. I touched it several times while the fishermen were busy looking out for fish, and could not find any loss of power in the discharge.\*

I would advise visitors at Cannes not to lose the opportunity, if they are in good health, of witnessing this night fish spearing; it is extremely interesting if successful, but hours often go by without meeting with any sport. They may try the spearing themselves, but will find, I am afraid, that it is not easy to

\* The torpedo is said to live in cold weather twenty-four hours after being taken out of the water, it shows but slight muscular power, and struggles but very little after being taken.



manage, even if the fish are so accommodating as to swim slowly past the boat giving them a fair chance.

The natives of the Mediterranean shores relish the taste of the cooked cuttle-fish or octopus, the fish with eight arms immortalised by Victor Hugo in his 'Travailleur de la Mer;' it may be seen in the fisherman's net contracting and dilating its bag-shaped body, and throwing about its long arms dotted with suckers. It is an unsightly-looking animal, but too small to be able to do much mischief; clearly Victor Hugo's "Pieuvre" was a monster of a much larger type. I never had any wish to taste the octopus, and do not think it likely English visitors would be tempted to do so. The "sepia" fish is also common in the fisherman's net, and if you should attempt to touch it will be sure to squeeze out its black fluid from the posterior part of its curious bag-like body, and cover you with it.

The local inhabitants, especially the fishermen, are fond of the inside of the sea urchin (*Echinus esculentus*); after breaking through the shell they pick out of the inside—a small, tough, pink object, the ovaries of the animal (Cuvier), which they eat raw with much gusto. I tried it once, and found its taste disagreeable and sickening, but I may be prejudiced against such kind of dainties.

Oysters, however, are quite another description of shell-fish, and can be had in perfection at such places as Cannes and Nice. It is well to eat oysters only on cold days, as in warm weather they soon lose their

flavour, although without becoming bad. There are various kinds of oysters to be had at Cannes, the "Cancale," the "Ostende," and the "Marennes," or "Huitres vertes."

The Cancale are the largest in size and the cheapest ; they cost about two francs a dozen and are very good. The huitres vertes are more expensive, and the smallest, and their taste is very delicate.

The rearing of oysters on the French coast of the Atlantic is on such an extensive scale, and interesting in so many respects, that I may be excused for entering to some little extent into this subject.

Fishermen bring them from oyster beds in various places along the French coast, and drop them in what are called parks (parcs) or "claires." These are shallow basins communicating with the sea, and so constructed that sea water is admitted into them at regular intervals. In these basins they are fattened, and soon lose the flavour somewhat bitter and coarse, of the oyster in its natural condition. These oyster-beds are met with near the mouths of the Sommes, of the Seine, and of the Rance (Cancale oysters), of the Loire, of the Charente, and of the Gironde. Between Le Havre de Brouage and the mouth of the Seudre the trade in oysters known as *the Marennes* is a source of great profit to the country. Their native banks are along the coasts of Brittany, Normandy, and Vendée, and they finally become the delicate oysters known as "Huitres vertes."

The Marennes oysters are white or but slightly



coloured when fished up from the depths of the ocean, but after a time they acquire in the basins, where they are matured for the market, a dark green colour, which is their particular character. The oysters taken into the Marennes artificial basins are usually one or two years old, and every year more than sixty millions are supplied from these beds, worth about £160,000 (four millions of francs).

At Ostende, reservoirs are made of masonry work, and can be completely emptied out by means of sluices. The beds are cleaned every twenty-four hours, and every attention is paid to perfect cleanliness. There are seven of these basins, producing fifteen millions of oysters annually, exclusively destined for exportation.\*

In America the rearing of oysters is carried out to a most extraordinary extent, and M. de Broca, who was sent by the French Government in 1862 to inquire into the culture of oysters in the United States, reports an annual consumption at that time of four thousand million oysters, of which there were 3,800,000 for New York only. Since then, the population of New York having increased from 805,651 in 1860 to 1,209,561 in 1880, the consumption of oysters is now likely to be greater by one half.

The cause of the green colour of these oysters has been carefully investigated by M. Puységur, and the following is gathered from a very interesting paper published lately by that gentleman.†

\* 'Dictionnaire Universel du XIX<sup>me</sup> siècle,' Larousse.

† 'Notice sur la cause du Verdissement des Huitres,' par M. Puységur, 1880.

Monsieur Gaillon, in 1820, observed on the shells of oysters small vibrios coloured green, which he called *Vibrio ostrearia*, but he did not pursue the investigation further. Mons. Paul Petit, in 1878, alludes to a particular kind of diatom having been found by M. Brebisson in the "Courseulles" oyster.

In 1875 Puysegur established oyster beds at "Sis-sable," which turned out very successful, the oysters reared in them becoming of a dark-green colour. These beds are lined with a soft mucous substance of a blackish-green colour, which, submitted to the microscope, proved to consist of masses of fusiform diatoms moving rapidly in the field of the instrument, and containing a fluid of a very fine azure-blue colour. The tinge is more distinct at the ends of the fusiform objects than in the centre. Treated with soft water, or water acidulated with hydrochloric acid, this *Navicula ostrearia* loses immediately its blue colour, and the liquid becomes green-bluish.

In order to ascertain whether this substance was the source of the green colour of the oysters, the author of the present paper selected a certain number of white or colourless oysters, and put them in plates containing some of the green substance from the beds, while similar oysters were disposed in other plates and left in pure sea water. After only twenty-four hours the oysters immersed in the green fluid were coloured green, and their stomachs and digestive organs were found to be full of the siliceous shells of the *Naviculæ*, while the colour had passed into the

blood of the oysters, and he observed that the parts showing the deepest green colour were those which contained most blood. The oysters kept in the plates holding pure sea water exhibited no signs of colour. It is obvious, therefore, that the green colour of the Marennes oyster is owing to their feeding on these *Naviculæ*, which are digested in their body, the colour passing into the blood of the oysters.

Both at Nice and at Cannes oysters are kept for immediate use in enclosures, into which the sea water has free access; these are called *reserves*. The "reserve" at Nice has a well-known restaurant attached to it, where the excellency of the oysters and lobsters (*langoustes*) attract daily numbers of visitors; the reserve at Cannes is not so well patronised. At Marseilles there are extensive *reserves*, which give their name to one of the best "restaurants" in France, where culinary art is met with in great perfection.

The "*langoustes*" (*Palinurus*) are very like lobsters, with the exception that they have no fore claws; their taste when boiled is somewhat similar to that of lobsters, although with a rather less delicate flavour. They are quite as large, and some acquire a considerable size. It is very curious to witness their struggles and fights in the "reserve," where hundreds may be seen together; they are of a most intractable temper and appear particularly fond of interminable encounters. They wildly attack flapping their tails, then pushing against each other, struggle

to raise their body ; having done so they lose their balance and fall backwards, when the contest begins afresh.

No doubt amateurs of oysters and lobsters should have them at these “reserves,” where they are taken from their native element and eaten with hardly a moment’s delay. Those who have had an opportunity of partaking of lobsters immediately after they have been fished will testify to the truth of this remark. I recollect when, years ago, spending a few days on that very picturesque spot amongst the Channel Islands—the Island of Sark—the very exquisite taste of the small lobsters taken in early morning, and which I used to get for breakfast.

*Milk and eggs.*—Among the articles of food met with on the Riviera milk and eggs are plentifully supplied, although the latter are not always fresh. Farmers are in the habit of keeping their eggs until they have a sufficient number to make them worth their while bringing to the market ; the effect of this system on freshness is obvious. At Cannes I used to succeed in procuring fresh eggs from a person who kept fowls and brought them in, charging three or four sous each. Any peasant or farmer keeping poultry will gladly sell eggs to a stranger who may be passing by, expecting of course to be paid a little more than in town. While at Nice I used to find this plan the only means of procuring new laid eggs ; should the farmer have none but eggs laid by in stock for the market, he would candidly say so. The eggs used at Cannes are

nearly all from Piedmont, and correspond to our shop eggs; these, however, undergo a close inspection by being held in the light; if translucent they are put aside and sold as new laid. Butter and cream are, as a rule, very good.

Asses' milk is obtained without any difficulty, and this is very important, not only for invalids, but also for young children shortly after weaning. It often happens that such food as Nestle's, and other preparations from flour, do not agree, when asses' milk will probably be found to answer the purpose very well. The donkey is brought round to the hotel or villa once or twice a day, as the case may be, and milked then and there.

*Wine.*—The wine card in the hotels is as full and varied as could possibly be wished for; what is mostly wanted, however, is a good "vin ordinaire," such as the claret to be had in London for eighteen or twenty shillings a dozen. I am afraid, however, most of that wine goes to the English market, and there is none left for home consumption. For some time I drank the red wine grown in the neighbourhood of the Riviera. It is not unpleasant, although it has a peculiar harsh astringent taste. After using it for some weeks I gave it up, and came to the conclusion that it is not good enough to drink for any length of time. I believe the best and cheapest plan for residents in villas is to have a cask of claret or Burgundy sent them direct from the merchant at Bordeaux or in the Burgundy districts, which they can easily do through

one of the house agents, who will undertake to bottle the wine.

*Olive oil.*—The staple produce of the South of France is the olive. Shortly after passing Marseilles, on the way to Hyères, Cannes, Nice and Mentone, the vegetation assumes a new form and olive trees may be seen in every direction ; at first solitary trees here and there are met with, but they soon become closer packed, and forests of them stretch out as far as the eye can reach. At a distance, they do not strike one as a picturesque tree, and have a gloomy aspect, with the dull dark tint of the green leaves, contrasting remarkably with the bright green summer vegetation of more northern climes. When the railway happens to pass over some embankment, the top of the trees only can be seen, and then the eye travels through hills and dales, over a rolling mass of dull dark-green foliage. Trees seen singly and from a short distance are often most picturesque from the irregular and varied form of their trunks. Some of them divide into two and reunite, others assume a spiral form as if they had undergone an actual twisting during their growth, others curve gracefully in various directions ; there is nothing straight in them to be seen, and the many curved and twisted lines are all in a pleasing though most irregular harmony. In groves of such trees, where they have attained a mature age, with plenty of room to grow, each of them is a study of itself, and the photographer will obtain a rich harvest amongst them with his camera. Good photographs



of fine old olive trees are very pretty, not only from the irregular and graceful lines of the trunks, but also from the multitude of their branches dividing and subdividing in a remarkable degree, then crossing each other, and intertwining in ever so many different ways.

Dr Sparks, in his valuable work on 'The Riviera' (p. 37), gives an interesting description of the olive tree and its fruit. He remarks that olive trees are multiplied by planting small branches of the young stems which spring up round the base of the trunk of an adult tree. The stock thus obtained is invariably grafted with a shoot of the peculiar variety which the farmer wishes to cultivate. Raised in this way the olive rarely gives more than half a crop until it is twenty to twenty-five years old, and it takes as long again if grown from seed. As to the longevity of the tree, Dr Henry Bennet\* remarks that it is said to be indefinite. There are olive trees, he states, still alive at Monaco, at the Cap Martin, and elsewhere, which are supposed to be coeval with the Roman Empire. The wood of the olive tree is used in many different ways. First of all it is excellent as fuel and a great deal is sold for that purpose; old trees, after yielding a goodly crop for many long seasons, when useless occupants of the valuable ground, are cut down, rooted out, and the wood is chopped up in small pieces for burning. Its oily nature makes it burn brightly and give out a cheerful flame. The wood is also used extensively in

\* 'Winter and Spring on the Shores of the Mediterranean,' p. 20.

the manufacture of the wooden inlaid tables, cabinets, workboxes, photographic albums, walking sticks, and other objects, which form one of the principal trades of Cannes and Nice. On arriving on the Riviera about November, the trees are found in full bearing of their fruit. The olives are smooth and soft to the touch, their dark blue or black colour being fully developed in December; they then look ripe and tempting to eat, but I cannot advise anybody to try them. When bitten into they are found to be very bitter and acrid, with an astringent after-taste, while a reddish-purple juice is given out. There is very little in the berry that recalls the taste of the oil, although the oil is there ready to be expressed. The ground may be covered with berries fallen from the trees, and it often appears a wonder that people do not pick them up, but they are not lost, and if not collected at the time they fall, are taken up later. In frosty weather, it is often saddening to see the olives remaining on the trees shrivel up and shrink, after which they soon fall; many a fine crop is thus spoilt. In the course of the winter, women and children pick up the olives on the ground, and then the trees are beaten with long poles, much in the same way as the walnuts are collected in the north. No doubt they suffer more or less from the rough handling, but it would be impossible to get in the whole crop without some such means. The olive trees do not stand cold weather; according to Dr Henry Bennet, they are destroyed by a frost of  $15^{\circ}$  to  $16^{\circ}$  Fahr., but



the young roots and the fruit are frozen and irretrievably injured when the thermometer falls  $6^{\circ}$  or  $7^{\circ}$  below freezing. It is not easy to form a correct estimate of the degree of cold which actually pervades the mass of the tree, as the frost in winter under the clear sky of the Mediterranean coast is mostly due to radiation. A thermometer sheltered above and at the sides by a screen 'louvered' like shutters, so as to admit a free circulation of air, will probably on a frosty night not fall below freezing; while another laid on the grass and fully exposed to the clear sky may register  $8^{\circ}$  or  $10^{\circ}$  of frost, or even more, and a third suspended three feet above the ground will show  $2^{\circ}$  or  $3^{\circ}$  of frost. In the same way a thermometer placed under or in the middle of a tree covered with leaves, will fall considerably less in a cold night than another freely exposed to the clear sky. It will be readily understood that olive trees will part with heat from the branches, leaves, and fruit nearest to the outside of the tree, while much of the heat absorbed during the day by the inner portions of the tree within a short distance of the outside, will in a great measure be retained at night. Therefore, although the temperature of the external air may fall low enough to damage olive trees, still the portion of the branches, the berries and leaves on the exposed side of the trees only, are likely to suffer. There is also another important circumstance connected with the influence of temperature on olive trees, as well as upon plants in general, that is, the

sudden changes in the degree of dampness of the atmosphere so frequent on the Riviera. Thus, after a heavy rain in the afternoon with an easterly wind, it is not uncommon to observe the wind shifting to the north-west, and in the course of a few minutes the dark leaden sky is cleared of its heavy clouds, while the air, which was saturated with moisture, rapidly dries up. It follows that a considerable evaporation from everything exposed to the air takes place, thereby creating an accession of cold. This cold is actually due to the absorption of heat required by the water in order to assume the form of vapour, and the absorbed heat is taken up from the objects on which the water rests. Thus the outside of the olive trees dripping with rain may be suddenly exposed to a considerable fall of temperature after sunset, while the inside of the bushy tree, which has been somewhat sheltered from the rain, will suffer much less ; it is, indeed, a most fortunate circumstance for the olive tree that its foliage should be so thick. Olives will therefore bear the cold much better in settled dry weather than after rain, and when the air is perfectly still they will stand a lower degree of cold than they would if wind was blowing. They suffer especially from the north-west mistral, because it is essentially drying, while the damp easterly wind has not nearly the same influence.

The olive berries, after being collected in baskets, are carried on mules or donkeys to the mills to be ground. I have witnessed on several occasions the operation as

carried out at Cannes and Nice. Dr Sparkes describes it minutely in his excellent book on 'The Riviera,' and I can confirm, as an ocular witness, the few details I now borrow from this author.

The mill consists of a millstone, hard, smooth, and fine grained for the first crushing, while another of a coarser grit is used for recrushing the residue of the first operation. The paste from the crushed berries is scooped out of the mill-trough and placed in bags made of some strong fibrous material. The bags are flat and open in the centre, and the paste is distributed with the hand throughout their area. Twelve of them, charged with the crushed berries mixed with cold water, are piled upon each other under a press worked by hand, from which oil and water flow out together into a reservoir, the oil rising to the surface. This is carefully decanted and kept as oil of the first quality. The second quality is extracted by repressing the paste with the addition of boiling water, which is poured over the bags as the press descends. The oil and water are again collected, and the former skimmed off.

The residue or cake left after these operations still contains some oil; it is ground afresh, placed into other bags of a finer and closer material, and again squeezed with a liberal addition of boiling water. The oil and water thus obtained are first run into a circular trough agitated by a water-wheel, and then into a long series of quadrangular stone reservoirs, each lower than the previous one, so that the surface water

passes from the first to the second and so on. Here the *débris* of the paste are deposited, while the oil rises to the surface and is skimmed off. A species of fermentation then takes place in this residue at the bottom of the reservoir, and more oil is set free, which is mostly used for making soap and lubricating machinery. The quantity of virgin oil, or oil of the first quality, yielded by one hundred litres of healthy olive berries is about twelve litres on the average, while four litres are obtained of the inferior quality.

The olive crops vary considerably from one year to another, only one good crop being expected once in every two or three years. Olive oil is, as a rule, very good anywhere on the Riviera; it has a fruity and nutty flavour, very different from that of the Italian oil, and which makes it all the better in my estimation, but some people might prefer the Italian or Lucca oil on that account. I recollect, on one occasion, tasting the oil at an oil mill; it is true the owner of the mill gave it as a sample of the finest product, and I am bound to say it was exceedingly pleasant. I have never since met with any olive oil that came up to that genuine superfine sample.

Olive oil is much employed in the South of France for cooking purposes, and the native population use it extensively in soup. Indeed, I am told that lentil soup made with it is particularly good. In hotels, fish, potatoes, fritters, are fried in olive oil, as butter does not keep long fresh in so warm a climate, indeed, it is much more satisfactory to know that good olive

oil is used for culinary purposes than doubtful butter.

Vegetables, although abundant in the market, command a comparatively high price. They are to be had fully a month earlier than in England; thus I have seen peas in full bloom and beginning to pod in January, and they continue bearing throughout the season. French beans are fit for picking in February; spinach and cauliflowers are eaten throughout the winter, while new potatoes can be had at Christmas, and indeed during the whole season.

Fruit, such as grapes, figs, peaches, pears, apples and chestnuts, is abundant in October and November; and later in the season orange trees in sheltered spots are in full bearing of ripe fruit. They often suffer much from the frost, and it is a pitiful sight to meet with trees, loaded with frozen and shrivelled oranges, falling fast to the ground. Orange gardens close to the sea, well sheltered from the cold winds, are usually those which yield the largest crops, and the well-known "Jardin des Hesperides" at Cannes, situated on a promontory at the sea-side, must prove a very valuable property. Lemon trees at Mentone ripen their fruit every year in the fullest perfection in sheltered spots, wherever water can be obtained. They are indeed much more numerous there than orange trees (Bennet), while at Cannes lemon trees are very scarce. This certainly appears to show a milder degree of the Mentone winter.

The taste of the figs and grapes, although very good,

is, however, somewhat less delicate than that of the same fruit cultivated in the north; the figs from a second crop in October and November are small, and the grapes not very highly flavoured. It is surprising how early figs may ripen in certain warm spots; thus, on the well-known headland of St. Jean at Nice, I have seen figs looking nearly ripe in the first days of May. Strawberries are beautiful at Cannes and ripen at the beginning of May. I have eaten there some of the largest and highest flavoured I have ever met with. The fruit of the cactus is sold in the market; it looks most tempting, but I cannot speak very highly of its taste although some people like it. As to the peaches, they appear all that can be wished for, but are hard and lack juice and flavour. It is singular that peaches in the South of France and Italy, where the climate is apparently so fitted to the ripening of fruit, should so far fall short in quality and flavour of the same fruit in more northern countries. This is owing mainly to their being grown amongst the vineyards, and not as wall-fruit, and partly, I should say, to the dryness of the summer season. In England, France, and Switzerland, peaches grown and ripened in private gardens attain a high degree of perfection, but require a great deal of care in their cultivation. The finest I have ever seen and eaten were in America, at Salt Lake City. The size and beauty they attain in that country is quite surprising; they are luscious and juicy in the extreme, and their flavour is simply



exquisite. On arriving at Ogden, where the line branches off from the Central Pacific Railroad to the city of the Mormons, peaches in basketsful, surpassing anything of the kind in other countries, were offered me at a trifling price.

On the whole, with a few exceptions, the Mediterranean coast is not altogether favorable to the growth of fruit, probably because of the spring and summer being too hot and dry, but also, I should think, for want of proper care and attention in their cultivation.



## CHAPTER II

### HOTELS, BOARDING - HOUSES, APARTMENTS AND VILLAS. SOCIAL LIFE IN THE HEALTH RESORTS OF THE MEDITERRANEAN COAST

THE selection of a residence in the health resorts of the Mediterranean coast must depend on a variety of circumstances, but as the object is the pursuit of health, and not mainly of pleasure, medical advice should be acted upon rather than the suggestions of friends. People preparing to go South are concerned most of all with the best means of making themselves as comfortable as possible abroad. No apartments or lodgings are to be had by the week, with food and attendance supplied, as in England, so that it will be necessary to have recourse to hotel or boarding-house (Pension) accommodation, or to a furnished apartment, or a villa for the season. As to the selection between hotel and boarding-house, I should certainly think hotel life the more pleasant of the two; there is more independence in that kind of residence, and, as a rule, the accommodation is of a better description, although the food and cooking may be equally good at both places. The great advantage of an hotel

is the freedom it affords by giving the option of leaving at any time. At a boarding-house, if an arrangement is made by the month or for half the season, or for the whole season, some difficulty and expense may be incurred should the necessity of leaving arise. Hotel life is undoubtedly the more expensive of the two, but it is a mistake to think hotels dearer at Hyères, Cannes, Nice, Mentone or San Remo, than in any other large town in France, Germany, or Switzerland; hotel expenses\* amount to from 20 to 23 francs per head per day for adults, are less for children, while there is a fixed charge of about 6 francs daily for servants. Meals may be had in one's own rooms or the guests can join the table d'hôte. It is well, however, to make inquiries beforehand as to the charges for extras, such as tea or beef tea, jelly, soups, or a plate of biscuits; I have known exorbitant prices asked for such articles. Every comfort to be wished for can be met with in a first-class hotel on the French and Italian Riviera; a family may secure an apartment consisting of several bedrooms and a sitting-room, all facing south, opening into each other and having a door leading into the passage. Let me, however, offer a passing remark on sitting-rooms situated at a corner of the house, and facing partly south and partly either east or west. There are probably two windows south and two round the corner; now these rooms in winter are usually cold, and where a uniform temperature of 62° or 63° should be maintained it will be found difficult to do so. I have frequently

\* Exclusive of boarding terms.

heard complaints of this description even in the very best hotels, and it stands to reason that two large windows east or west, probably closing more or less imperfectly, must let in a considerable amount of cold in the coldest part of the season. Of course it will be important to select rooms with a southern aspect, but this is so well understood that invalid guests will never be shown into north rooms. Most bed-room floors have a set of bedrooms facing north, and there is no objection to their being tenanted by people in good health. It frequently happens that the best apartments on the south sides, have a series of small bedrooms opposite on the other side the passage, destined to the use of the servants, which is a very convenient arrangement. Many invalids cannot go upstairs, and it will be important in their case to choose rooms on the ground floor, or make sure there is a lift. Most large hotels have one, which is extremely convenient, and every attention is paid to safety in its management.

I believe I am safe in stating that most of the new hotels have baths attached to them ; where there are none, recourse is to be had to some bath-house in town. Cannes has several establishments where both warm and medicated baths can be taken. It should also be borne in mind, that warm baths are carted from the various bath-houses to the hotels, hot and cold water being carried in casks. The bath is prepared ready for use in one's own room, and removed afterwards at a very reasonable cost ; allow-

ing a bath to be had within an hour or perhaps less of the time of its being ordered. Medicated baths, vapour baths, douches of various descriptions, can be taken at the bathing establishments which are clean and comfortable, although occasionally wanting perhaps in the luxury of modern bathing establishments. In this respect I am bound to say that up to the present time Nice has been somewhat better supplied than Cannes.

Hotels have, with but few exceptions, gardens attached, and most of them a lawn tennis court. The gardens may cover several acres, and often display a fine collection of semi-tropical trees and plants, such as orange trees, the eucalyptus, the pepper tree, mimosas and palm trees, while the Bougainvillea, with its beautiful flowers, which grows wild in Madeira and the Canary Islands, is only met with in warm sheltered spots. Aloes, camerops, aralias, and various other plants of the south are all common in hotel gardens, and in the spring, anemones, geraniums, roses, hearts-ease, and many other flowers makes them bright and cheerful. The orange trees cast a pleasant shade at noon, under which it is common to sit. In the spring time the smell of their bloom, and the aromatic scent of the cassia fills the air with a fragrant smell.

First-class boarding houses afford practically the same amount of comfort as hotels, or nearly so, but are less expensive, the charges being from twelve to fourteen francs a day. The food cooking and

attendance are much the same, but as a rule the apartments are less roomy, the hall and passages rather smaller, and they afford less of that luxury which, without being a necessity, certainly adds to comfort. In a social point of view, people unacquainted with each other associate less together in hotels than they do in "Pensions," and there is less community of feeling. While in boarding-houses the guests usually meet in the drawing-room after dinner, and sit and talk together for an hour or so, it is customary in hotels to withdraw into one's private apartments or remain but a few minutes in the public "salon." Hence it is that single ladies or single gentlemen coming out by themselves or with a servant only, frequently choose boarding-houses where they are more likely to make friends, and have a better opportunity for social intercourse; families, being able to dispense with new acquaintances, often prefer hotel life. The main point, however, is that life in a boarding-house is decidedly cheaper than it is at an hotel. Many, and, if I mistake not, most hotel-masters enter into arrangements with their guests for periods of a fortnight or a month, but on rather higher terms than boarding-houses.

Although there are no lodgings to be had on the Riviera, still a large and handsome building has been erected quite lately at Cannes, where apartments are let, each of them consisting of a suite of rooms with a private entrance on the main staircase and forming an entirely separate dwelling. The rooms are large,

lofty, well-furnished, and as comfortable as possible ; and although the building is very high, a lift takes you home to the upper stories, without putting you to the least trouble. Every apartment has its kitchen, so that a cook can be engaged, together with one or two other servants ; or if it be preferred, the waiter calls at your apartment every morning with the bill of fare for the day, thus breakfast, luncheon and dinner are ordered to be served at any time that may be most convenient, obviating the necessity of keeping a cook, and the discomfort of cooking when carried on close to one's sitting-rooms. This house, known as *La Madeleine*, is spoken of very highly for its comforts, and its apartments are eagerly sought for. Furnished apartments, or floors, can be had of various sizes, but except in those of the best description I am afraid I cannot often say much for the furniture. Servants have of course to be taken, and cooking is done either at home or at some restaurant, where an arrangement is made for the supply of food at regular charges. Apartments must be taken for the season, and their price varies from two or three thousand francs to ten thousand (£80 to 400) ; they can be had cheaper late in the season.

The best apartments in most of the hotels at Cannes are secured some time before the beginning of the season ; hence it is advisable to write to the hotel master and make sure of good accommodation. People arriving in January or February often have to put up with small rooms in upper stories.



Taking a villa is a much more serious business. After a residence of one or two seasons at an hotel, when the climate is known to agree, the love of home, with its comforts and pleasures, which every Englishman brings out with him to the South, suggests the idea that it would be pleasant to hire a villa, first of all for one season. There are a great number to choose from at Cannes, Nice, Mentone, San Remo, and other health resorts on the Riviera; but, unless an early application be made, the best and most conveniently situated may already be let. The first consideration is to decide whether the villa should be situated near the sea, or at an elevation at some little distance from the seaside. At Cannes and Nice there is no difficulty in finding villas in both situations. It must be borne in mind that at the immediate seaside the lowest temperature of the air is higher by about 3° F. in the coldest months, than it is on high ground some eighty feet above the sea, except on a slope facing the south. The climate near the sea is decidedly more windy than it is in many places inland, as the hilly nature of the country affords sites for building in places sheltered from the wind. Moreover, gardens in the immediate neighbourhood of the sea are often less thriving than those at some little distance from it, the dry wind, known as the mistral, greatly interfering with the growth of the eucalyptus tree and many shrubs and garden plants. Having lived for five consecutive winter seasons in a villa close to the



sea at Cannes, I can speak from experience. Another objection to a seaside residence is the glare of the Mediterranean, and this may be a serious consideration ; the sea being south of the house, the sunlight is all day long reflected on white walls, on your garden, and on whatever you may happen to look at, so that after a lapse of several months the eyes, without actually suffering, become tired and long for a softer and darker field of vision. Villas on the seaside are, as a rule, situated near a high road, and the dust is another drawback.

It should also be remembered that the air at the immediate seaside is often very irritating to the nervous system, interfering with sleep at night, and that the roar of the sea frequently keeps people awake for some time before they have become accustomed to its monotonous sound. Moreover, the immediate seaside is less bracing and invigorating than sites at some distance from the sea, and some height above it, and on that account may perhaps not suit in a medical point of view, but this subject will be considered hereafter.

I hope the reader will not think I am attempting to throw discredit on the seaside residences of the Mediterranean coast ; I only wish to consider fairly their drawbacks as well as their merits, and the fact that I have spent five winters at Cannes close to the sea, and that the inmates of my villa all enjoyed good health during that time, surely speaks well for the immediate seaside. The sight of the sea with its fleet of small boats and the picturesque appearance

of the coast are an everlasting source of pleasure, which can only be enjoyed by living close to the shore. The views of the Mediterranean from the high ground are, it is true, often very beautiful, but they lose much of their interest from the distance.

Villas situated on the hills have also drawbacks as well as claims to favour. They are usually at some little distance, and perhaps rather far from town, an objection applying to Cannes, Nice and Mentone, all built on the seaside. This circumstance may prove inconvenient in many respects, and mainly perhaps from the necessity of the frequent use of a carriage. Villas away from the immediate seaside often require a stiff climb to reach, and people suffering from some affection of the lungs would not quite appreciate the idea of having a hill to walk up in order to go home ; moreover they may be rather exposed to the wind, especially if built on slopes rising directly from the sea, although it often happens, as I have already remarked, that private residences inland are well sheltered. This was the case with the villa in which I spent my sixth winter at Cannes ; it stood at a height of eighty feet above the sea and was rather less than a mile from it, but the mistral or north-west wind was hardly felt there at all. Many hotels some little distance inland, and amongst the low hills at the back of Cannes, are also perfectly sheltered from the north-west wind. The temperature of the air varies much more with the site of a villa than might be anticipated. Those built on slopes rising from the sea are, as a rule, the warmest

of all. The sun comes down with full power and its rays fall nearly perpendicularly at noon on such places, so that the soil absorbs a large amount of heat, which at night checks the fall of temperature of the atmosphere. Moreover, in the night-time warm air from below rises along hill slopes, and when they overlook the warm Mediterranean sea the heat the water gives out at night must naturally assist in keeping up the temperature after sunset. Again, the loss of heat at night from the earth, very great under the clear Mediterranean sky, is rather less on a hill slope than in an open plain, as the side of the hill has a tendency to intercept radiation.

The slopes and tops of low hills inland are not unfrequently selected as sites for villas, especially when they happen to be sheltered on the north-west side, so as to be out of reach of the "Mistral" wind; still such places are occasionally somewhat colder at night than villas at the seaside or built on high land facing the sea. The reason is obvious, these houses receiving no heat from the sea; or, at all events, much less than villas within immediate reach of the warmth given out by the Mediterranean. The actual altitude has not much to do with this accession of cold, as I know places at Cannes near the sea level, though separated from it by a tract of land and a belt of trees, to be decidedly colder at night than the immediate seaside or slopes rising from the coast. It stands to reason that these spots become cold at night by losing the heat absorbed in the daytime,

while very little warm air can reach them from the sea on account of the trees; on the other hand, the colder air of the hills, from its increased weight, visits these tracts of lowland after sunset, and flows over them till sunrise.

There are many other circumstances to be considered in the selection of a villa; and the state of the drainage should be carefully looked into before taking a house for the winter. As there is no system of drainage for the villas, cesspools are very general; they are usually constructed close to the wall of the house on the north side, are built of stone or brickwork, and vaulted over. In the new villas they are usually supplied with a ventilating pipe opening above the roof; and it is very important to ascertain whether such ventilation exists. A cesspool is large enough to allow of its not requiring to be emptied during the winter. Nothing of it is seen, as a stone plug covers its opening, and the whole disappears under a gravel walk. In the course of the summer it is emptied, a work often undertaken by people from the country, who cart away its contents in casks and use it as manure.\* Care should be taken to make sure that the cesspool is empty on taking possession of a villa; should this not be the case, it is not unlikely that the process of emptying and cleaning out will have to be done during the winter, which is sure to prove extremely unpleasant.

\* There is also a "Compagnie des Vidanges," which undertakes to empty cesspools.

It will also be important to ascertain the state of the scullery drain from the kitchen. If this drain opens into a separate cesspool care should be taken to make sure that the cesspool be properly ventilated, and it will have to be emptied and cleaned out several times during the winter. I have known the kitchen waste pipe of one of the newest villas at Cannes to drain into a cesspool adjoining or next to the wall of the house on the south side, a pipe led from it to a reservoir near the stables, a distance of about twenty yards, whence the fluid was pumped up from time to time. The smell from the water was something beyond description; and, although the\* work was done at night, and the water carried away in casks, the atmosphere in the bedrooms was strongly polluted, while even the next day the odour was quite conspicuous round the house. Another objection to this method of draining the scullery is the fact that some of the tainted air from the cesspool is occasionally driven back into the kitchen, especially when a sudden fall of atmospheric pressure occurs. Of course the pipe may be trapped, but I question whether even that precaution is effectual.

The only mode of improving the drainage of villas and hotels would be to do away with cesspools entirely, and have a system of drainage for carrying the refuse into the sea some distance from town.\*

Since Lord Brougham had a "château" built at

\* The subject is at present under the earnest consideration of the authorities at Cannes.

Cannes in 1834, land has been purchased from time to time by English visitors, who have erected villas upon it for a winter residence; and of late the number of these villas has greatly increased. Hence building land has risen very much in price, and is now worth ten or fifteen francs a mètre, or from £1619 to £2428 per acre; in town, even forty francs a mètre are charged.

The main circumstances to be borne in mind in the selection of a site for building are—1st, the situation relatively to the distance from the sea; 2nd, the distance from town; 3rd, the view; 4th, the position with reference to the possibility of other houses being erected on the southern side and shutting out the view; 5th, the dryness of the soil; 6th, the presence or absence of trees, as it will be important to have a few trees on one's own grounds. The best site at Cannes, I should think, would be the sloping ground of a wooded hill facing the sea, such as the Californie Hill, the advantages of such a site are—a light soil with rocks not far below the surface, many lofty pine trees, a beautiful view of the sea, and especially the circumstance that nobody can easily obstruct it; the purchase of two or three acres of land will secure against any risk of the kind, thanks to the slope of the hill. Should anybody object to such a position because of the necessity of going up and down hill in one's own garden, it will be easy to find a flat piece of ground on the side of a hill; and so many roads have been made at Cannes that no



difficulty need be experienced in purchasing land accessible to carriages. The sloping ground of the hills on the Mediterranean coast dries very rapidly after rain, and there is no fear of any risk from dampness. Such a site as that I am suggesting to build upon, will be sunny and warm, and less subject to a fall of temperature at night in the coldest part of the season than most other places.

The water on the Riviera, as obtained from wells, is hard, containing much lime, but when procured from mountain springs is of excellent quality. At Cannes the water supply is all that could be wished for. It is derived from a stream called La Siagne; a dam has been constructed across the river at a place known as St Cézaire a thousand feet above the sea, and it is hence the canal brings the water to the town. This aqueduct is quite open except in a few places, but there are extensive filtering tanks by means of which everything in suspension, such as leaves or twigs of branches, is entirely removed; on the other hand, any organic matters in solution in the water must be decomposed by the air, as the water rushes down the hill through stone gutters, like a foaming torrent. The canal is kept very clean, and every care is taken to have the water as pure as possible; it is soft in its character and well adapted to washing purposes. Many villas have a large reservoir in their grounds supplied with water from the company, which proves very useful for watering the garden and lawn.

The gardens are seldom large enough to require the



whole of a gardener's time, and there is no trouble in finding a man who has several gardens to keep up, and will undertake to attend himself or send somebody to look after any particular garden once or twice a week. It will be well, however, to keep an eye on these men and ascertain that their work is well done.

Horses and carriages are easy to find. There are very comfortable two-horse landaus to be hired by the day, or by the month at 700 or 800 francs (£28 to £32); and at Cannes and Nice a large number are let out every season. Unless it should be wet, they are always kept open, though not unfrequently the fore part is put up as a protection against the draught. There is no difficulty in procuring broughams to go out to evening parties. Stands of small open "victorias" are not wanting, but these carriages all withdraw after sunset, and have to be bespoken if wanted in the evening.

Pleasure boats at Cannes, all yawl-rigged, are managed by two boatmen—skipper and mate, and these men can be thoroughly trusted. The skiffs are open boats, from 17 to 25 feet in length, have a good wide beam, and a small quantity of ballast; they inspire confidence at first sight, indeed they stand rough weather very well. In the morning some twenty or thirty of these boats may be seen high and dry along the shore in front of the market-place with all sails set, and their skipper alongside looking out for a customer. As there is no tide on that coast, the boats hauled up ashore are always close to the water

edge and ready to be launched. When one of them is hired it is sent afloat on rollers, and the party walk on board over a plank hooked to the prow, which projects in a rather unsightly way some few inches above the stem of the boat. The usual sea trips at Cannes are to the "Iles Lérins" or to the coast at the foot of the Esterel Hills. These short cruises are most enjoyable, although it often happens that the wind either does not suit, or is wanting altogether, and the oars not unfrequently come into requisition. On leaving in the morning, in settled fine weather the air is usually calm, but there is a slight swell; towards noon a breeze from the south often begins to blow, veering in the evening to the south-west, so that a fair light wind for returning in the afternoon may be expected. The breeze sometimes increases suddenly, and it may blow hard, but this is seldom the case, and with experienced boatmen no anxiety need be felt on that score. I have known scrofulous children wintering at Cannes in a weak state of health derive great benefit from a daily sail in one of these boats; the sailors are particularly careful of children, and appear to find much pleasure in doing their best to amuse them.

On fine days there is a great demand for sailing boats, and unless secured the day before, the best are not unlikely to be found engaged.

When the strong north-west mistral blows, the sea becomes one mass of white breakers as far as the eye can reach, and no sailing boat puts out of the harbour; but if the high wind should continue for several

days, it becomes necessary to send supplies to the monks in the Convent of the Island of St. Honorat. It is then that the skill and pluck of boatmen or fishermen show themselves. As they get under weigh early in the morning, it is only their return in the afternoon one has in general an opportunity of witnessing. It is, indeed, a fine sight to behold the light skiff running in, close-hauled, with no mizen-sail, and the main-sail close reefed. Her bows to leeward are all but under water, but she rises to the sea like a bird, and shakes off the spray from her stem in a masterly style. As she rounds the pier-head just under the spot where you are standing, you will see her keel nearly out of water, while the boatmen, sitting in a row on the windward bulwarks with their oilskins on, are preparing to lower the dripping sail.

*Social relations.*—The social relations in the southern health resorts are of a very pleasant nature. There is, however, a feeling that pervades society in all such places, from a consciousness that people are brought together for a time, and not likely to meet again afterwards.

Hotel and boarding-house life brings together people whose interests, thoughts, and tastes often meet, though sometimes clash, and a community of ideas is frequently soon established. Guests after making acquaintance in the public "salon" drive out together, take long walks, in fact, they find in each other's company, comfort and pleasure. Such companionship helps to get through the winter plea-

santly, and I fully believe social intercourse of this kind goes far to account for the winter season passing off rapidly and leaving none but an agreeable recollection.

There are not many dinner parties at Cannes, and, indeed, the *table-d'hôte* system is not conducive to that mode of entertaining friends. On the other hand, afternoon tea affords a great opportunity for ladies to see each other and talk over the local news. Balls are becoming much more frequent than they used to be, and many an excuse is found for venturing out to a dance in the chilly night air of the Mediterranean coast. Concerts and private theatricals in hotels often afford amusement in the evening to the guests and their friends. Good music in the afternoon has great attraction, and concerts between two and four o'clock are usually well attended.

Picnics are common, and bring people together who are glad to make common cause in a foreign land. Thus, new acquaintances are made, and Cupid is offered a golden opportunity. The beautiful climate of the south allows a day to be settled for a picnic a long time beforehand, thus giving an opportunity for large gatherings. Off they go at ten o'clock along the dusty road, five or six carriages in a row, the roomy "*landaus*" taking in four or five of the party, while the hampers packed one over the other on the box and at the back of the carriage have an unmistakable meaning of cold fowl, *patés de foie gras*, salad, and champagne. Although it may be some time

in January, the ladies and some of the gentlemen have their white parasols turned towards the dazzling sun, but there are cloaks and shawls in store for the return.

Open-air amusements are in great force in places where the beauty of the weather is in itself a sufficient inducement to be out most of the day, and they afford excellent excuses for out-of-door appointments. Everybody joins at lawn tennis, and no out-of-doors exercise is more in favour at present at Cannes. There is hardly an hotel without its tennis ground; the spot is carefully laid out, and where a slope occurs the remedy is close at hand by levelling it down on a sufficient area. Netting is erected round the court, and the game is played throughout the winter with as much art and spirit as it is at home. Some hotels have a number of courts side by side, where five or six games can be played at the same time. It looks singular, indeed, to see gentlemen playing tennis in shirt sleeves in the beginning of January, when the principal amusement in England may be skating. Most of the visitors to the Mediterranean health resorts are ladies, and, of course, they have a large share in the organisation of the game. But tennis courts are not limited to hotels, and several villas have regular tennis parties throughout the season, where some excellent play may be witnessed.

The weather cannot of course always be fine, and at times rain comes down heavily. What is to be done under such an unwelcome state of the sky?

people stay at home and complain; indeed, it seems to be a real pleasure to abuse the weather heartily when an opportunity offers. The weather, at all times a favourite subject of conversation, is usually, it must be admitted, spoken of in terms of praise; but not so always, and there are people who seem to like to complain of it at any time; for them it is either too warm or too cold, the continued glare of the sun tries their eyesight, the dust of the roads irritates their throat and makes them cough, or perhaps they find the weather monotonous because of the long succession of fine days, and would prefer a change.

The days at Cannes are usually spent in the following way:—Breakfast is ready at nine or half past nine, and consists merely of tea or coffee, chocolate, and bread and butter. After breakfast, if a picnic or a drive for some distance into the country has been decided upon, or if a boat has been secured for the day, a start is made with the luncheon in a basket. Otherwise a stroll is taken into the garden; and it is a real enjoyment to draw in deep breaths of the fresh balmy air before the sun has risen high above the horizon; indeed nothing recalls winter, the trees are nearly all evergreens, and the eucalyptus and orange trees afford a grateful shade from the bright sun at midday.

Eleven or half past eleven o'clock is a convenient time for correspondence, and the hour for luncheon is at hand long before it is thought to be due. After lunch, some go out for a drive, while others play tennis for a couple of hours, either in their own grounds



or at some hotel where friends may be staying. Those who do not play look on and talk, and there seems to be no lack of subjects for conversation, although but very seldom of a deep or learned character. While engaged at tennis, appointments are made and arrangements entered into for future meetings and excursions. The game over, there follows afternoon tea; here the ladies have the talk mostly to themselves, and it is carried on in a lively way. The new arrivals are discussed, dress and fashion come in for their share of the conversation, the health of the children is minutely gone into, and it is not unlikely that people staying in any particular hotel are reviewed—the one found charming, the other—the less said about him the better, and so on.

But the setting sun suggests that the time has come to move homewards. The open victorias hired out from the various stands are then seen hurrying about, and very shortly after sunset the streets become deserted; the cabs drive to their stables, and the bustle of the lively Mediterranean seaside town, with its gay winter population, has quieted down till next morning. It is difficult to make out why carriages for hire should vanish from their stands immediately after sunset, but so it is at Cannes, to the great inconvenience of the few who may be kept out late.

On returning to one's hotel there is usually more visiting going on, but this time it is within the house, and a great deal of this kind of pleasant intercourse takes place at Cannes. People knock at each



other's door, and a welcome "Come in!" is often an introduction to a large party, all of whom have dropped in unawares. The dinner hour now draws near and everybody retires to dress.

Dinner is a very serious affair, and as the clock strikes six, or half past, as the case may be, the sharp ring of the dinner bell summons all the party round the table-d'hôte. The dinner is seldom over under three quarters of an hour or an hour. I am not sure whether much conversation goes on during the meal; it takes some time for those sitting next each other to break the ice, and they may not always be in mutual sympathising harmony, or there may be a fear of some clever person with a discussive turn of mind originating a general conversation which may perhaps take a turn unpleasant to many of the guests. The great advantage of table-d'hôte is undoubtedly the facility it gives with reference to the cooking and attendance. So far the hotel-master benefits, but the guests are also the gainers to some extent, as they can have a much better dinner with a greater variety of dishes than if they were dining separately, while at the same time the charge is much less. I do not think, however, the "table-d'hôte" system is as popular as it used to be, and many prefer dining at separate tables when they can do so. It often happens that somebody not belonging to the hotel is invited to dinner, and if, as often occurs, a person is asked to dine with three or four friends, he must of course be limited for conversation to those on

his immediate right and left, which may detract very much from the pleasure of the dinner.

It is sometimes agreeable to change one's diet a little, and the table d'hôte at another hotel is tried. Some hotels have a reputation for cooking, and there is no wonder that a few epicures should at times forsake their own table d'hôte and ascertain for themselves whether such a name is wrongly or rightly deserved.

As a rule, hotel-masters are most obliging, and should any of their guests be detained beyond the time for the table d'hôte, there will be no difficulty in procuring dinner for them. After table d'hôte people often meet in the public drawing-room or "salon," and after a few moments' conversation withdraw into their own apartments. Those who have no sitting room of their own are tempted to remain somewhat longer in the "salon." There may be musical amateurs amongst the party, and some good vocal or pianoforte music helps to while away the evening. After dinner on Sunday hymns are often sung, in which many of the guests join. Thus one day after another is spent at Cannes, and much the same kind of existence is met with at the other health resorts on the Mediterranean coast.

With respect to places of worship, besides Roman Catholic churches, there are on the various Mediterranean stations Church of England, Scotch Presbyterian, German Lutheran and French Protestant churches. There is also hospital accommodation well deserving support. At Cannes the Asile Evangélique is a

building which holds about thirty-two inmates. Its main object is to accommodate Protestant servants of all nations and visitors in poor circumstances who fall ill during the season. The management is under the immediate direction of a gentleman and his wife who live on the premises, while a committee of some of the oldest residents exercises a general control over the establishment. The medical work is done by physicians, both French and English, who take it in turn, and after having been personally on the staff of this "Asile" for five years, I can assure the reader that the establishment is one which does a very great deal of good.

Another institution, an Invalid Ladies' Home, is about to be opened at Cannes, which will be a great boon to a large number of ladies in ill health who cannot afford the expense of wintering in that favoured spot, and with whom the climate of the south will be likely to prove of great benefit. Care has been taken to have the building erected on the best site for such an object, and every attention will be paid to the hygiene and management of the establishment. There is also an "Asile Evangélique" at Nice, while invalid ladies have a home called the "Helvetia" at Mentone. A similar institution exists at San Remo.

## CHAPTER III

### ON THE NATURAL LAWS OF CLIMATE

ALTHOUGH what I have to say of the meteorology of health resorts will be thoroughly plain and simple, still, in order to enable my reader to follow me rapidly and with no trouble through that part of my subject, I must beg leave to commence by offering a few remarks on the principles of meteorology, or those laws of nature on which depend, first of all the climate, and then the weather. By climate of a place is meant the mean terrestrial and atmospheric conditions under which it exists, and to which its inhabitants are naturally submitted. The word has a relative rather than an absolute meaning.

Thus the British climate is said to be damp and cold, but it is warm compared to more northern countries and cold in relation to southern parts. The winter climate of the South of France is said to be warm and dry, but it is not to be compared with tropical zones. The conditions of the atmosphere connected with climate are its weight or pressure, temperature, degree of humidity, state of motion, and electrical state; while these different conditions react

upon the earth and sea, producing certain changes according to known laws.

The source or origin of all meteorological phenomena is the sun, which sends or *radiates* its heat to the earth through the molecular vibration of the invisible matter connecting earth with space. We can judge what the absence of the direct influence of the sun would be from the state of the Polar regions through a long season of darkness and intense cold. Vegetation would become totally extinct and human existence could not possibly continue. As it is, the sun, moving apparently from south to north and *vice versâ*, distributes its favours in turn throughout the whole of the habitable globe, while the greater heat of the sun's rays between the tropics is the cause of a centre of meteorological influences from which they spread far and wide.

It has been suggested that the sun, from the spots visible on its surface, does not always give out precisely the same amount of heat; at all events, certain meteorological phenomena have been ascribed to these spots, and Mr. C. Meldrum, in 1873,\* after stating that in the Southern Indian Ocean cyclones are more frequent and more violent in the maxima than in the minima sun-spot years, concludes from an examination of all the rainfall tables (containing one or more sun-spot periods), that the maxima sun-spot periods show the greatest amount of rainfall. More

\* "On a Connexion between Rainfall and Sun-spot Periodicity."  
'Proceedings Roy. Society,' 1873.

recently Mr. T. Norman Lockyer and Mr. W. W. Hunter,\* in a very interesting paper in the 'Nineteenth Century,' endeavour to show that the degree of rainfall in India is connected with the greater number of spots on the sun, one cycle or period of eleven years including the greatest number of spots and greatest rainfall, and the other the least of both.

The heat of the sun spreads like a fan, becoming less and less as its rays fall more obliquely on the earth. This heat is transmitted through our atmosphere, raising its temperature but in a slight degree, although a certain amount must be absorbed, as if there was no air round the earth we would feel the heat of the sun to a much greater extent. After the sun's rays have reached the earth a portion of the heat they bring with them is converted into motion, another is reflected into space, and a third is absorbed by the earth. In the daytime, with a bright, warm, and genial sun, the power of motion of the sun's heat is at its maximum; at night, all is quiet, men and animals sleep, plants and trees are arrested in their growths, and the atmosphere is usually still; indeed, the motor power of the sun is at its minimum.

Heat is measured as to its degree by obtaining indications of the direct *mechanical power* it exerts when dilating the mercury in the bulb of a thermometer, the readings of the instrument being proportional to its intensity. Thus an increase of tempera-

\* "Sun-spots and Famine," by T. Norman Lockyer and W. W. Hunter. 'Nineteenth Century,' 1877.



ture by  $2^{\circ}$  means that the heat is twice as great as for  $1^{\circ}$ , or a combustion twice as great will be required to give out  $2^{\circ}$  as was wanted for  $1^{\circ}$  of heat. Heat acts in opposition to molecular cohesion, so that if the temperature should lessen, molecular cohesion causes a contraction of the mercury, and a fall of the thermometer is the result. The heat of the direct rays of the sun, or *solar radiation*, is determined by thermometers with blackened bulbs, maintained in a glass sheath free from air and hermetically sealed; they are known as "black bulb thermometers *in vacuo*." The instrument is one which has already given very useful indications, and is destined, I believe, to increase greatly in importance. The theory of these thermometers is briefly this. The sun's rays fall upon a thermometer from which no loss of temperature can take place from contact with the atmosphere, as it is obvious that the atmosphere being colder than the black bulb exposed to the sun, would rob it of a certain amount of heat if it were in immediate connexion with it; the truth of this remark can easily be demonstrated experimentally.

It is usual to consider as the true degree of solar radiation, not the actual reading of the black-bulb thermometer *in vacuo*, but the difference between this figure and that expressing the temperature of the air taken simultaneously in the shade under a screen. For instance, if the solar thermometer should indicate a temperature of  $106^{\circ}$ , and at the same moment a thermometer under a screen  $55.5^{\circ}$ , the true solar



radiation would be said to amount to  $50\cdot5^{\circ}$ . I have thought it best, however, to give the temperature shown by the black bulb *in vacuo*, as recorded in my journal, and without subtracting that of a thermometer in the shade, because a person in the sun would be actually submitted to the sun's heat as observed from the reading of a solar thermometer, or rather to a temperature somewhat lower, as the air in contact with the skin would deprive it of a certain amount of that heat. The records of my observations of Cannes show maximum solar temperatures and the corresponding maximum temperatures in the shade, so that, if required, it will be easy to subtract the latter from the former.

The direct solar heat becomes greater at increased altitude above the level of the sea; this is owing in some slight measure to the layer of atmosphere through which the sun's rays have to pass becoming lessened in thickness and density, but especially to a falling off of the moisture it contains. Above the usual level of clouds, say from 7000 to 8000 feet, the air is much drier than below, and an accession of solar heat, which may be considerable, is met with at such altitudes. I shall have an opportunity of stating that on the Peak of Teneriffe, at 9000 feet, according to the astronomer, Mr Piazzzi Smyth, the sun raises the black bulb thermometer *in vacuo* to the temperature of boiling water at the seaside, while oddly enough in winter at Davos, 5000 feet above the sea and in the midst of

snow and ice, the sun is warmer than at Cannes under the blue sky of the Mediterranean seaside.

The most striking illustration, I should say, of the transformation of solar heat into motion, may be derived from a consideration of the influence of heat on the human body under the tropics. Here a burning sun, shedding its vertical rays overhead at noon, heats every inanimate object to a temperature barely allowing of the contact of the hand ; but men and animals come and go fully exposed to that intense heat, and yet their temperature is either not raised at all, or increased but to a very trifling extent. The heat falling on the living body has been transformed into motion, into that motion which means life. But another form of the transformation of the sun's heat into motion, and one which is of all importance in meteorology, is shown from its power of evaporating water. A certain quantity of this heat is absorbed by the surface of the sea, and then taken up and retained by the vapour so long as it remains under that very form, while it is given out again upon undergoing condensation and returning into the state of water. It will be found in 'Herschell's Meteorology,' p. 51, that every grain of water evaporated carries off with it sufficient heat to raise 960 grains  $1^{\circ}$  Fahr., to supply which that quantity of the residual water must have been cooled  $1^{\circ}$ . As not far from two thirds of the earth's surface is covered with water, the enormous amount of heat daily disposed of for the formation of vapour and cloud, to be given out again when

rain falls, is barely conceivable. This vapour, either invisible or visible, ever forming at the surface of the ocean, is wafted about over sea and land.

I have no intention to do more than give a mere insight into a few of the most interesting laws of meteorology, but must ask my reader for a little more patience.

Vessels on their way out to the Cape, after crossing the Bay of Biscay, pass the latitude of Cape Cantin,  $32^{\circ} 39'$  north; there they meet what is known as the north-east trade wind, a regular north-east breeze carrying with it banks of cloud, forming now and then into a Scotch mist, but usually hovering overhead at an altitude of about 3000 feet. These trade-wind clouds, through which the lofty Peak of Teneriffe shows itself but occasionally to the passengers on board the Cape mail steamers, move in a southerly direction for about nine months in the year, some being driven towards the coast of Guinea, where they become a source of heavy rains. This bank of cloud attains a thickness of 2000 or 3000 feet, and forms like a flat belt covering the sea possessed of well-defined boundaries above and below, but especially on its upper surface. Hence the rapid evaporation from the surface of the sea assumes a visible or tangible form. The vapour as it leaves the sea rises higher and higher, carrying with it a certain quantity of air, and an ascending current is formed, driven in a south-westerly direction; the mist is therefore blown up diagonally into the bright warm space above, where the sun is all-powerful, the air extremely

dry, and the sky overhead nearly always cloudless, at all events in summer. I shall have an opportunity of alluding again to this interesting subject when describing the Island and Peak of Teneriffe, and of alluding to that remarkable volcanic mountain on which I spent three weeks in 1878.

The capacity of the atmosphere for moisture, or its power of absorbing water, suddenly increases under the hot sun, at an altitude of about 5000 feet, and there the trade-wind clouds vanish into space, much as the steam from a locomotive steam-pipe disappears mysteriously in dry air. Above the bank of trade-wind clouds the air is perfectly pure and extremely dry; the moisture of the sea is still present, however, but it occupies a much greater space than when under the form of mist. Thus it expands upwards until it meets a return current of warm air from the south-west at an altitude of between 12,000 to 15,000 feet.

This wind, already charged with moisture, continues deriving an additional amount of humidity as it progresses in a northern direction, whilst its capacity for moisture diminishes as it approaches the colder northern latitude. Here meeting with low atmospheric pressures its relative weight is increased, and these various circumstances unite to bring about the condensation of the moisture and its return to the earth and sea in the form of rain. Hence the amount of rainfall in the British islands will depend in a great measure on the temperature of the water of the Atlantic and the height of the barometer over Europe;

an increase in the temperature of the Atlantic by a fraction of a degree must produce an accession of rainfall in the north, while the reverse will take place should the water cool to that extent. No doubt, on the other hand, that long-continued high barometer readings such as those observed during the present winter (1881-82) will account in some measure for the remarkably low amount of rainfall in England and in northern countries throughout the corresponding period.

It was stated at the beginning of this chapter that on reaching the earth a portion of the sun's heat was reflected into space, and another absorbed. All objects coloured white reflect the sun's heat as well as the sun's light; thus white walls and tracts of white sand send back into space much of the heat they receive; while the dark coloured soil, plants and trees absorb it to a much greater extent. The reflection of the sun's heat is most striking on high mountains covered with snow, where it is so great in summer as to produce inflammation of the eyes and of other parts of the body exposed to the air. How often at such places as Chamounix or Zermatt are young men met with, their face and lips so swollen and their features so altered that they can hardly be recognised.

As to that portion of the sun's heat which is absorbed by the earth, it is emitted by "radiation." On rising above the earth in a balloon, in the day-time, a thermometer carefully sheltered from the rays of the sun will be seen to fall, because the

focus from which the heat of the sun is received becomes more and more distant ; but at night with a clear sky this is not the case. It has often occurred to me to inquire into the cause of the nights being, as a rule, so much finer than the days, both in the Mediterranean basin and at home. This must be owing to a combination of circumstances, the principal of them being : —1st. The rise of temperature of the atmosphere at night in the region of clouds owing to terrestrial radiation. 2nd. The diminished evaporation from the soil. The increased warmth of the atmosphere after sunset to an altitude of 1900 feet was clearly observed by Mr Glaisher in his balloon ascent from the Woolwich Arsenal, October 2nd, 1865.\* He left the arsenal at 6.20 p.m., the temperature being at the time  $56^{\circ}$ ; at an elevation of 900 feet the temperature was  $57^{\circ}$  and increasing. On reaching 1200 feet it had risen to  $58.9^{\circ}$ . He then descended to 900 feet, when the thermometer fell to  $57.8^{\circ}$ . On beginning to reascend the temperature increased to  $59.6^{\circ}$  at the height of 1900 feet, being  $3.5^{\circ}$  warmer than when the earth was left. The moon was then shining brightly and the sky free from cloud. On descending again the temperature decreased to  $57.5^{\circ}$  at the height of 600 feet.

Nothing can show more conclusively than these observations that the atmosphere at night becomes warmer at increasing altitudes. Of course the region of clouds between six and eight thousand feet high had not been attained on that occasion, but still it may

\* ‘Travels in the Air.’ By J. Glaisher.



be safely inferred that if terrestrial heat dries up the atmosphere in the lower regions, it will thereby exercise an influence towards checking the formation of clouds at greater altitudes.

At sunset and immediately afterwards, on clear nights, the soil begins to lose its heat by radiation, and a thermometer in contact with it will show a rapid fall of temperature. Many have been conscious of this sudden chilling sensation in England on a fine winter day, between the hours of four and five o'clock in the afternoon. The greatest degree of cold I have felt at sunset was on the Peak of Teneriffe, in July, where I spent the day in a cotton dress, and had to put on a thick great coat lined with flannel as soon as the setting sun reached the horizon. The coldest part of the night is just before sunrise, the reason of which is obvious, as by that time the earth has attained its greatest degree of cooling by radiation.

It is customary in meteorology to record the extreme terrestrial radiation at night, or nocturnal radiation, by means of a minimum thermometer laid on the grass and fully exposed to the atmosphere ; there should be no object near it, such as a bank, a wall, or trees, likely to interfere with the phenomenon. This method, however, is open to certain fallacies which it is impossible to avoid ; thus, rain or dew, by wetting the bulb of the instrument and evaporating afterwards, may give rise to a greater degree of cold than would be due to radiation only.

I have stated that it is through the mechanical power of the sun's heat that the evaporation of water takes place which is returned to the earth as rain, or, in other words, that water in order to assume the form of vapour must absorb a certain quantity of heat, which it retains so long as the state of vapour is preserved. As soon as condensation begins, this heat is given out; and when rain falls, exactly the same amount of *heat* is emitted as was originally required to evaporate the water. What becomes of it? It is clearly taken up by the cold air which caused the condensation, thus checking, more or less, further rainfall, so that rain possesses a self-controlling influence. It must also have a tendency to produce draughts and winds by rising into higher regions, carrying moisture with it. The short duration of spring showers must be due in some measure to the enormous quantity of heat given out by the sudden condensation of moisture; this heat, added to that of the sun, will suddenly clear the weather as soon as the influence of the cold agent which produced condensation has commenced to subside.

*Local conditions of the distribution of humidity and dryness, heat and cold.*—The amount of humidity held in suspension in the atmosphere, in an invisible form, varies according to the temperature of the atmosphere, the direction of the wind, and several other circumstances. When rain falls, the air holds as much or nearly as much moisture as it can retain, and is said to be saturated or nearly so, and in ordinary fogs

and the regions of the atmosphere where rain is actually formed there exists also a state of saturation. It has been observed that with two rain gauges placed at different heights, the lower one is usually found to contain more rain than the upper one, showing either that the rain drops have increased in size as they were falling, or that fresh drops have formed between the high and low gauges, which, however, is not very likely to have been the case. The distribution of the rainfall must be influenced by local circumstances to a very great extent, considering that in the same country, in the British islands for example, its amount varies considerably in different districts.

The nearer the atmospheric humidity is to saturation of course the more likely will be the rain to fall. Thus, in London during the winter, where the atmosphere is seldom more than slightly below the point of saturation, rain frequently falls, while on the Riviera, where the degree of atmospheric humidity is lower, rain is far from being so common. At altitudes above 6000 or 7000 feet near the tropics, when the stratum of clouds has been left below, a region of the atmosphere is attained where dryness reigns supreme. Here a cloud overhead is quite the exception, and weeks follow each other without so much as a speck of a fleecy patch of mist in the dark blue sky. This is not, however, owing to an absence of moisture in the air, but to the fact that the atmosphere is very far from being saturated.

Let us suppose a closed vessel containing a layer of

water at the bottom ; in due time this water will evaporate to a sufficient extent to fill the air of the vessel with humidity to such an extent that no more water can be transformed into vapour, and the evaporation will cease ; the air is then said to be *saturated* with moisture. If the air in the vessel should now be cooled down in the slightest degree, some of the humidity will be deposited in the form of water or dew on the sides of the jar. If, on the contrary, it is heated, its capacity for moisture increases, or in other words, it becomes drier and more water is evaporated. As the heating of the air in the jar would increase the pressure on the surface of the water, the evaporation would of course be greater should the vessel be now opened and placed in communication with the external atmosphere. Hence the moisture of the air is generally expressed as *relative humidity*, or as the fraction of that humidity which would be required to saturate the air at the temperature observed when the degree of moisture is recorded.

A phenomenon similar to that occurring in the above illustration takes place in nature. An overcast sky and warm sea represents the closed jar with the layer of water at the bottom ; this seaside air is becoming gradually saturated with moisture, and a fall of temperature, although but slight, will bring on a state of supersaturation ; dew will be deposited, or rain will follow. After the rain has ceased, a slight accession of heat will increase at once the capacity of the air for moisture, hence the warm sun will now be able to

disperse the clouds and the atmosphere will dry up rapidly.

This drying process, through the agency of condensation and heat, and the moistening of the atmosphere from a reverse phenomenon, are common occurrences in warm countries not distant from colder climes. Thus, the "Provence" and the French and Italian Riviera are visited by both very dry and very wet winds; the former, which blows from the north-west, brings the air from the continent of France after it has deposited its moisture in the form of rain over comparatively cold regions; the hot sun of the Mediterranean coast soon disperses the moisture left in it, and a state of great atmospheric dryness ensues. On the other hand, the damp north-east, east, and south-east winds, from Sardinia or the Gulf of Genoa, after losing some of their heat on the Maritime Alps, bring over rain and stormy weather to the Riviera.

It will be readily understood that when the air is very cold and the weather fine, the degree of atmospheric humidity must be low. This is, indeed, invariably the case, and on bright winter days the atmosphere may become very dry.

At such places as Davos, at 5000 feet above the sea, where the weather is generally fine throughout the winter, the relative humidity of the atmosphere is low during the daytime, especially about noon, while after sunset the humidity increases, not on account of evaporation, as the nights are intensely cold, but from the capacity of the air for moisture becoming lessened.

In mountainous countries a fall of snow in autumn is usually a sign of fine weather, because it shows a very cold state of the higher atmosphere; this cold air has been losing much of its moisture, becoming ready to dry up at the slightest accession of heat.

In a foggy and damp climate, such as that of London, the first accession of cold in winter will often be attended with an increase of *atmospheric moisture* instead of *dryness*, from want of the warming or drying power of the sun. A case in point happened the very day I was writing these lines. On December 13th, 1881, in the afternoon, a dense fog covered London, extending to the suburbs, and becoming so thick at 5 p.m. that, except in well-known districts, it was scarcely possible to pick out one's way through the streets. This fog was dry, containing about 70 per cent. of moisture only; it was very pungent in its character and trying to the eyes. The next morning at 9 o'clock there was still a slight fog, which soon cleared away. Between 10 and 11, when the air was clear and the sun coming out in a pale-looking sky, my instrument for registering humidity (hygrometer) showed the air to be saturated or all but saturated. At 2.15 p.m., when the atmosphere might have been considered in its state of maximum dryness for the day, with the sun struggling through a light misty vapour, and a temperature of  $42.5^{\circ}$ , there was no less than 81 per cent. of relative humidity, which is a rather high figure; the same evening rain fell heavily. In this case the temperature was rather low; the



fog had lifted into the higher regions of the atmosphere with a rising barometer, very high on the 14th, and there intercepted the sun's heat, which was consequently devoid of drying power. The aqueous vapour from coals burnt and water heated in London all but saturated the cold atmosphere, so that although there was no fog, still fog was on the point of forming. Had the upper mist dispersed, and the sun shone out brightly, instead of putting on as it did a very dull appearance, the dampness of the atmosphere would have been expected to diminish to a great extent.

In England, the east and north-east winds, after blowing over colder countries, where they deposit their moisture, reach us comparatively dry, and it is worth noticing that, although they usually bring cold with them, thereby reducing the capacity of the air for moisture, still they are so dry as to be in general the forerunners of fine weather. On the other hand, the south-west wind, charged with moisture from the Atlantic, dropping down upon our islands into a colder climate, brings wet weather with it.

The degree of humidity of the air may be expressed under two different forms, as either the weight of moisture contained, for instance, in a cubic foot of air can be given, or the proportion of moisture relative to saturation or *relative humidity* may be recorded. The atmospheric moisture is, however, usually reckoned as relative humidity, saturation being 100. The instruments for indicating the relative humidity of the atmosphere are called hygrometers, most of which

give the required indications by showing the temperature at which dew is deposited, on cold being produced by the evaporation of some volatile fluid, such as ether. If the dew point is reached with but a slight accession of cold the air is comparatively damp, should a considerable fall of temperature occur it will be much drier. Daniel's hygrometer is constructed on that principle. de Saussure's hygrometer shows the relative humidity by means of a hair, which moves a small hand along a graduated scale in different directions, as it contracts by dryness and dilates by moisture. The usual plan, however, is to select two thermometers showing indications agreeing well with each other, and one of them has its bulb covered with fine muslin applied tightly round it. The muslin is kept constantly wet or wetted at the time of the observation, and the degree of cold produced by the evaporation of the water is compared with the temperature of the atmosphere as shown by the other instrument. If the air is saturated, the two thermometers will read alike; should it be very dry the readings will vary to a considerable extent; the percentage of moisture can be obtained by reference to tables. This instrument is called the psychrometer or *Psychromètre d'Auguste*.

The relative atmospheric humidity on clear days varies considerably throughout the twenty-four hours; it is usually at its maximum at the coldest hour of the night, say shortly before sunrise, and at its minimum at the warmest period of the day, or between twelve and two o'clock.

The *absolute* amount of humidity or vapour in a given volume of air does not, however, follow the same course. Supposing, for instance, that on a summer's day the readings of the thermometers should be  $70^{\circ}$  for the dry and  $64^{\circ}$  for the wet bulb, and at night  $60^{\circ}$  and  $58^{\circ}$ , the relative humidity will be in the daytime 69 per cent., and at night 88 per cent.; but the absolute weight of vapour contained in a cubic foot of air will be 5.1 grains in the daytime, and 5.5 grains at night, while if in proportion with the *relative humidity* there should have been 6.5 grains of moisture instead of 5.5.

In winter in a usually dry climate such as that of Davos, the well-known Alpine winter sanatorium, the variation of relative humidity throughout the day is observed in a marked degree. It is stated in a paper by Dr C. T. Williams on the winter climate of Davos,\* that the relative humidity at that station varies daily from between 30 or 40 per cent. in the middle of the day, to about 72 per cent. at 7 p.m. On the Peak of Teneriffe, above the region of the clouds, the difference between the readings of the dry and wet bulb thermometers fell from about  $24^{\circ}$  or  $25^{\circ}$  at noon, to a difference of  $11^{\circ}$  or  $12^{\circ}$  after sunset. In London during the winter season the difference of the readings would vary at most by about  $6^{\circ}$ . I should be inclined to think that an observation made about 9 a.m. would be more likely to yield the average *daily humidity* than at any other hour.

\* 'Journal of the Meteorological Society,' 1880.

As already stated, the degree of atmospheric humidity depends very much on the direction of the wind. I had an interesting illustration of this fact while at the seaside on the Island of Teneriffe. The air at the time was still, and the difference between the readings of the dry- and wet-bulb thermometers amounted to  $10^{\circ}$ . Suddenly a puff of the damp north-east trade wind was felt, when the difference between the indications of the two instruments fell at once to  $6^{\circ}$ .

It has often been asked, how is it that the air at sea and at the immediate seaside is not always saturated with moisture, especially when the sea water is warmer than the atmosphere, as in the case of the Mediterranean? Indeed, it appears remarkable at first sight that this should not invariably be the case. If the atmosphere were perfectly calm, the sky overcast, and the sea at its surface warmer than the atmosphere, no doubt the air would soon become nearly saturated with moisture. Winds, however, are more or less prevalent at the seaside, and a dry wind from land will of course lower the degree of atmospheric moisture, while a wet wind from the sea will increase it. Moreover, the sun coming down with great power on the Mediterranean coast, increases the capacity of the air for moisture, or, in other words, dries it down to the sea level.

The degree of atmospheric moisture inside a house or dwelling is often very different from that met with at the same time in the open air; it is seldom damper

but often much drier. In summer, when no fires are lighted, the air is equally moist indoors and in the open air, but in winter fires dry up the air in the rooms, and the atmospheric humidity may fall very low. With people in good health breathing this dry air is attended with no ill effects, and, indeed, is not noticed; but where chronic catarrh or old-standing sore throat enforces seclusion indoors, this excessive dryness of the air may prove very trying, and is certainly objectionable.

The only means of moistening the air is by steam, but unless a large volume of steam be emitted, the accession of moisture may be so slight as to escape the indications of a delicate hygrometer—an observation I first made at Cannes in the bedroom of a patient, in which an “Etna” was steaming.

In order to supply a large volume of steam in a sick-room, I have had a bronchitis kettle made,\* through which several vertical tubes are carried, thus imitating the tubular boiler of a steam engine. The flame of the fire, from either coal or gas, plays through these tubes, and the surface of contact between the fire and the kettle is thereby greatly increased. These kettles I have found to give out a larger amount of steam than the ordinary ones with the same fire; they are made and sold by Mr Probyn, chemist and druggist, in Davies Street, Berkeley Square, and Pall Mall, and I can recommend them as calculated to evaporate more water within a given time than those in common

\* ‘British Med. Journal, April, 1881.’

use, and thereby better fitted for the purpose of steaming the atmosphere of a room. A tap has been fitted at the side of the kettle, enabling hot water to be procured from it at any time.

In order to complete the present chapter I should now allude to the local conditions of the distribution of heat and cold. This subject, however, will find its place in the account of the climate of the various health resorts.



## CHAPTER IV

WINDS AND WEATHER ON THE MEDITERRANEAN.—PURSUIT  
OF HEALTH FROM A MEDITERRANEAN CRUISE

I MUST beg to premise that it is altogether foreign to my object to enter upon the physical geography and hydrography of the Mediterranean; but I shall ask my yachting reader about to engage on a winter cruise for health's sake on the dark blue water of this beautiful inland sea, to allow me to give him a few hints on the weather he is likely to meet with.

Cruising on the Mediterranean is a particularly healthy pursuit. Rear-Admiral Smyth, in his valuable book on 'The Mediterranean,'\* states that "it is gratifying to know by evidence which cannot be disputed, that the highest degree of health is enjoyed by the British Mediterranean fleet." He gives a table, furnished by Sir William Burnett, the Director-General of the Medical Department of the Navy, showing that during a lapse of seven years from 1830 to 1836, the annual ratio of deaths per 1000 of mean

\* 'The Mediterranean, a Memoir, Physical, Historical, and Practical,' by Rear-Admiral William Henry Smyth, 1854.

strength was only 8·6, including those from wounds and accidents.

It is hardly possible to realise, when contemplating the placid waters of the Mediterranean on a fine calm day from the shores of the Riviera, to what extent the surface of that sea may be ruffled by the wind. I recollect being in May, 1874, a passenger on board one of the Fraissinet Line of steamers from Ajaccio to Marseilles; on this occasion our vessel had to contend with a very strong north-west wind, and we were delayed eight or nine hours beyond the usual length of the passage. The seas were running very high, and the rolling and pitching was such as to leave a lasting impression. The waves, however, on that occasion appeared to me rather shorter than those of the Atlantic, and perhaps not quite so high; but they seemed to exert great power on the vessel. I had two ladies with me who remained below the whole of the time, and as they had a large ladies' cabin to themselves, were as comfortable as possible under the circumstances. It may be concluded that sea sickness is as prevalent on the Mediterranean as it is on the ocean. The immediate cause and symptoms of that painful and distressing illness are obvious enough and few have escaped it, while all sorts of theories have been proposed to account for the ill effects of the motion of a vessel on man and animals. My experience at sea is pretty extensive, having crossed the Atlantic several times, and on one occasion on board the old discarded, though most beautiful and com-

fortable Great Eastern Steamship. I have also enjoyed yachting on the British and Norwegian coasts, and have had every opportunity of observing the distressing symptoms of sea sickness—occasionally, though seldom, on myself, but often on others.

The first sensation on walking on board ship for a person unused to the sea is an indescribable uneasiness in the head; the sun if out appears too hot, if conversation be commenced it will be found laborious from the difficulty of collecting one's thoughts; no motion may be actually felt, and yet the floor under one's feet is in want of firmness. If called upon to go below the uneasiness is increased, although without any positive sensation of pitching or rolling. This state may last for a while, and then disappear after getting what is commonly called one's "sea-legs," although it proves unfortunately but too often the commencement of a bad attack. The way sea sickness begins appears to me to show that the first influence of the motion of a vessel is on the brain, and originates from a disturbance in the circulation of that organ. A similar phenomenon occurs on a common swing; some people even from stooping suddenly to pick up some object, or turning round rather quickly, will experience a momentary sensation of giddiness or faintness; indeed it may be said that any sudden change of position of the body has a tendency to bring this on, somewhat in the same way as the roll and pitch of a vessel at sea. The failure of the pulse is one of the earliest symptoms, if not the

very first of sea sickness. This shows a deficient state of the circulation throughout the body, and of course in the brain ; but a mere weakness of the heart's action would not suffice to explain the subsidence of brain-power in sea-sickness, and there must be some peculiar condition of the cerebral circulation interfering with the nutrition of the brain, and consequently with its healthy functions ; the state of the brain reacts upon the stomach, hence the sickness ; I do not believe sea sickness begins from indigestion.

As to the treatment of sea sickness, the most useful means will be those calculated to check it at its outset, as an attack fully developed will prove, I am afraid, very difficult to arrest. I have been told that purgatives at the beginning of a sea voyage have assisted in mitigating the severity of an attack. Then, medicines calculated to promote sleep must be very useful if taken before the stomach rejects everything, and chloral is an excellent means of attaining this object. Indeed, I am informed by a lady who constantly takes it while crossing the British Channel that it proves effectual in her case.

A method of treatment was proposed some years ago (in 1864) by Dr Chapman,\* which I have found decidedly useful on some occasions, namely, the application of ice to the back of the neck. The best way is to fill an india-rubber bag with pounded ice, and place it in contact with the nape of the neck, keeping it in

\* 'Functional Diseases of the Stomach.' Part I, "Sea Sickness, its Nature and Treatment," by John Chapman, M.D.

its place with a handkerchief ; two or three pounds of ice will probably suffice for a short passage of an hour or two, such as that of the British Channel, and may give great relief, if not entirely ward off the attack ; at the same time it will be necessary to remain lying down.

Perfect stillness of the body in the recumbent position is invariably found to afford great comfort, and the importance of being out in the fresh air rather than in stuffy cabins need not be insisted upon. Brandy is a delusion and a snare in sea sickness, and should never be resorted to, but I have often found champagne very useful, and can recommend it highly from experience both upon myself and others. A small glass of champagne is not unlikely to drive away the first sensation of sea sickness, but it must be taken at an early period of the illness.

Persons in good and robust health will find their sea legs sooner than those who happen to be in a debilitated condition, and I can state from personal experience that when crossing the channel tired and out of sorts, I am not nearly so ready to withstand the motion of the vessel as when fresh and rested. It will be found useful in order to keep off the baneful effects of the sea, to leave after digestion has just commenced, say about half an hour after a meal. Food can be had on board if the vessel is lying in smooth water ; otherwise it will be better to eat before going afloat. It is a mistake to think, as some people do, that the best plan is to start with an empty stomach, as obviously, under such a condition, the circu-

lation will be more easily affected by the motion of the vessel than when excited by food undergoing digestion.

Finally, if on embarking for a sea passage of some duration, the sea be calm for the first day or two and become rough by degrees, sea-sickness will be much less likely to occur than if the sea be disturbed at the very outset. Few people fail to get their sea legs after being three or four days at sea, but with many, if not most landsmen, there will be usually felt an indisposition to undertake brain work, together with a peculiar sensation of laziness or want of energy. It is singular that Humboldt should state in his writings, if I mistake not, that he found the time he spent at sea the most convenient and available for working, and never felt so ready for mental exertion as when afloat.

On my way from Gibraltar to Marseilles in 1878, on board one of the steamers of the Compagnie "Paquet" of Marseilles, shortly after leaving Gibraltar we met with very high and long seas, recalling the long rolling Atlantic swell; the breeze was light and entirely failed to account for such waves, which lasted at least two days. The movements of the vessel were slow, though the angular displacement was very great. Rear-Admiral W. H. Smyth, to whose work I shall have frequent opportunities of referring, observes (p. 242) One of the "peculiarities of this gulf (Gulf of Lyons) is the sudden rising of its waves and their attaining a size not at all proportionate to the strength of the winds. Both their amplitude and elevation are greater than would be considered to result only from



the action of the wind on the aqueous particles ; and their increase under a gale cannot be regarded as uniform. The absolute height of these waves from the trough to the crest in severe weather cannot be much less than thirty feet. The waves of the Mediterranean in general gales may be estimated between fourteen and eighteen feet in height." The sea at Cannes is seldom free from a swell, though of course nothing like the long roll of the Atlantic. Large vessels may not feel it, but it is very perceptible in small boats.

On leaving Gibraltar, with an easterly course along the coast of Spain, the wind will be found to blow either from the east or west points of the horizon. Of these winds the east is the worst and most violent ; hence Señor Ayala, the Spanish historian of Gibraltar, terms the east wind the tyrant of the straits and the west their liberator. Within the Mediterranean the predominant breezes are from the north and west quarters, except in the spring when south-east and south-west prevail. Bad weather, however, always gives sufficient warning through the barometer, and it may be laid down as a general rule that whenever the barometer falls as low as 29·40 inches, severe weather may be looked for. Admiral Smyth informs us that by keeping a watch on this instrument, and acting in accordance with its indications he, never once in three years, while commanding a ship in that sea, had occasion to turn up the hands at night. It must be added that as a rule the nights are calmer and freer from clouds than the day.

Proceeding up the Mediterranean towards the Gulf of Lyons, while the climate in summer is found usually fine and dry, in winter the gusts of winds from the mountain ranges are often furious, particularly in the vicinity of the Pyrenees. In winter the south-west gales, called *Birazones*, send in a great sea along the coasts of Andalusia and Grenada. Along these shores, and especially those of Catalonia, a dense mist generated on the ocean precurses the easterly winds.

Gales from the north-east, easterly to south-south-east, are met with along the shores of Valencia and Catalonia. They commence with a moderate breeze, usually from the eastward, but freshening as the wind draws round to the south-east, and then blowing very violently.

The coast of France forms a deep bight between the Pyrenees and the Alps, which, from its gusty turbulence even in the summer months, has been immemorially designated the Gulf of Lyons.\* This gulf is notorious for gales, and sudden changes of wind, Rear-admiral Smyth relates that on the 22nd May, 1798, Nelson was assailed by a sudden storm in the gulf, which carried away all the "Vanguard's" top-masts, broke the foremast into three pieces, sprung the bowsprit, washed a man overboard, killed a midshipman and a seaman, and wounded several more. Again, while Lord Collingwood was blockading Toulon with his flag flying on board the "Ocean," a roomy, new ninety-eight gun ship, he was assailed by a succession of hard gales. In one of these his vessel was nearly

\* [*Lions*] usually spelt in English "*Lyons*."

lost, being completely disabled by a terrific sea that threw her nearly on her beam ends. This occurred about the middle of the Gulf of Lyons with the wind at north-west.

Among the winds of Languedoc and Provence must be mentioned the chilly north-west "mistral." After losing its moisture under the form of rain in the Cevennes Mountains and other cold districts in France, it blows occasionally with great force along the coast from Marseilles to Genoa. It is very disagreeable to the feeling and injurious to vegetation from its great dryness: hence the couplet—

"La Cour du Parlement, le mistral et la Durance,  
Sont les trois fléaux de la Provence."

Admiral Smyth suggests, that the piercing cold complained of by the natives of the South of France during the continuance of the mistral, is owing to the immediate transition from a high temperature to a lower one, as well as to its actual frigidity, and he has himself experienced very chilly sensations from this mistral with the thermometer at 50°. I do not think, however, that it is the actual temperature of the wind, or the contrast, when it follows upon hot weather, which accounts for its cooling properties, but the *state of dryness* it possesses causes increased evaporation from the skin and thereby a feeling of cold.

At sea, along the Riviera, the weather is much the same as on the coast, the wet winds blowing from the north-east, east, and south-east, and those which fore-

stall fine dry weather coming from the west and north-west. It must not be thought, however, that the Mediterranean is invariably rough in winter; indeed, this is far from being the case. From my experience at Cannes, in January and February the weather is often fine for weeks in succession; the nights are calm or attended with but a light northerly breeze, so that little or no progress can be made in a sailing vessel; in the morning, at about 10 o'clock, a light south-easterly breeze rises, increasing in strength after 12 o'clock, when it shifts to the south; late in the afternoon it veers to the south-west, and then drops by degrees. At sunset a northerly land breeze begins, which is felt till midnight and perhaps later. At the same time the sea is calm, and the afternoon breeze is just strong enough to ruffle its blue surface, though not unpleasantly even for small boats. Sometimes heavy black clouds gather in the south, attended with lightning and thunder, or a dark leaden sky in the east foretells a strong easterly "duster" with wet weather. Should a change of wind occur and the north-west mistral get the better of the north-east storm wind, many minutes may not elapse ere the sky is again entirely clear of the rolling masses of cloud. The temperature of the air, to which I shall have an opportunity of alluding more fully hereafter, is warm and comfortable in the sun, and will allow of an invalid remaining on a vessel's deck most of the day, but at sunset it is too cold to be out in the open air.

On the coast of Piedmont, and from thence to Tuscany, the summers are fine, but the winter is ushered in by violent storms of lightning and rain, with occasional hail, the northerly winds, however, always clearing the air.

The Tyrrhenian Sea, between the coast of Italy and the islands of Corsica and Sardinia, is greatly agitated by south-west gales of wind. In those bays which bound the ravines and valleys of the higher grounds, the "raggiature" or land squalls are violent, though not very extensive in their action. The more notable "burrasche," or mountain storms of Calabria, commence with masses of clouds, coursing, displacing, and effacing each other, like oceanic waves, in rapid grandeur; the tempest then rages, but its energy is soon exhausted. It would appear, from Admiral Smyth's remarks, that in settled fine weather there is much the same regularity in the winds on the Italian coast as on that of the Riviera.

Along the coast of Corsica boisterous gusts occasionally blow from the hills. As a rule the mountains of the Mediterranean seaside supply cool air to the valleys, and these winds occasionally rush out seawards in descending blasts. In winter there are strong gales from December to March, and the north-westers send in a heavy swell upon the exposed shores of Corsica.

In and around the Island of Sardinia the most prevalent winds are from west-north-west to north, and from the eastward. The mistral is felt on its coast as

well as on the northern shores of the Mediterranean, and brings in a long swell from seaward. It may blow for many days in succession, occasionally, though not necessarily attaining the force of a gale. I shall have an opportunity hereafter of referring to this wind well known on the Riviera. The west wind is seldom unaccompanied by rain ; still it is always welcomed on the coast on account of its favouring the arrival of shoals of "tunnies." The south wind is a stormy winter visitor, while the north-east and east winds bring on squally weather attended with heavy rains. Sardinia has a great deal of very fine weather, and the calms of the summer months are harvest times to the fishermen.

The Island of Sicily occupying the central station of the Mediterranean Sea may be said to enjoy the average of its winds and weather. The summers are fine, but after the autumnal equinox (21st September) the winds become boisterous; fogs increase, particularly on the coast, and rain falls in frequent and heavy showers. The most prevalent winds in summer blow from the northerly and westerly quarters ; they are dry and healthy, feeling most pleasant under the clear sky, while a modification of the mistral is enjoyed at Palermo as a most refreshing sea breeze. Winds from the east round to southerly are loaded with unwholesome mist.

On the north of Sicily are the Æolian Islands, the fabled residence of the god of winds, and there are certainly more frequent atmospheric changes among this group than in the neighbouring islands.



The Islands of Malta and Goza, south of Sicily, although possessed of the steadiest climate of Europe, are subject to occasional and beneficial disturbances of the weather. In winter the winds are occasionally very boisterous. The most violent gales are from the north-east, which rake the harbours of Valetta and send in a prodigious swell. The south-wester is the hottest of the summer breezes, and is much disliked by the Maltese; but the most annoying visitor of the Mediterranean islands is the Sirocco or south-easter. After sweeping over the hot and parched deserts of Arabia and Africa, it reaches the east coast of Sicily, somewhat cooled by its passage over the sea, though now appearing to acquire additional heat as it advances. At its commencement the air is dense and heavy, with long white clouds settling a little below the summits of the mountains, and, at sea, floating just above the horizon in a direction parallel to it; the thermometer slowly rises with a continuance of the Sirocco to  $90^{\circ}$  and  $95^{\circ}$ , though the feelings seem to indicate a much higher temperature. The hygrometer shows increased atmospheric humidity, and the barometer gradually sinks to about 29.60 inches. This wind usually continues three or four days, during which period its influence is such that meat cannot be effectually salted, oil paint laid on will seldom take or harden, metals oxidize more readily than under ordinary circumstances, clothes are mildewed, and everything becomes clammy.

The sirocco is peculiarly disagreeable at Palermo, where Admiral Smyth complains much of the dejection

and lassitude it produces. It is more frequent in the spring and autumn than in summer, and invalids suffer from it also in winter.

The navigation of the Adriatic Sea is rather dangerous from the liability of being caught without sufficient sea room. The winds generally blow up and down its lengthways; during the summer months they are light and variable, with frequent calms and occasional squalls. The entrance to this sea is liable to sudden gusts, but towards the centre of the gulf the winds are steadier. In the Gulf of Trieste the weather is notoriously unstable, the heavy northerly blasts called Boras with fogs and squalls being frequent during the winter. The occurrence of the Bora may fortunately be known some hours beforehand by the appearance of a dense dark cloud on the horizon, with others of a light fleecy aspect above them, and it is immediately preceded by a breathless but speaking stillness. It generally blows from between north and north-east, and continues about fifteen or twenty hours, with heavy squalls and terrible thunder, lightning, and rain at intervals. Sometimes it blows in sudden gusts for three days, subsides, and then resumes its former force for three days longer. I have often been struck with the resemblance of the wind—the Bora—with the *Bise*, so well known in Switzerland. The “bora” like the “bise” is a north-east wind. The bise is not preceded, as a rule, by dense clouds on the horizon, but is accompanied by a dry mist clearly visible at a distance of ten or twenty miles, the mountains at

the north end of the Lake of Geneva being seen through a haze, while the lake is one mass of foam driving over its surface. Like the bora, the bise may last three days and drop, returning for three days, but it may continue blowing hard for a longer period. The bise, however, is a dry wind, and not usually accompanied by lightning and rain, although occasionally rain falls heavily while it is blowing.

I cannot refrain from quoting an instance of the effects of the Bora on shipping at "Lossin Piccolo," as related by Admiral Smyth. "The scene was now awfully grand; masses of clouds were in motion from the zenith downwards, excluding by degrees the brassy sky, while a momentary stillness was only a presage of the coming storm. At this time all the fishermen were making for the shore, and the whole marina resounded with the shouts of people endeavouring to rowce up their vessels on the strand. At length huge drops of rain splashed down, and the whole atmosphere seemed to resolve itself into black smoke, while the north wind was seen approaching by the eddies of sand which it threw up before it. The gust now reached the ship, roaring tremendously, with such force that both our cables were snapped like twine, and before we could bring up with the best bower and sheet anchors, veer to forty fathoms, and brace the yards by—which was effected with a celerity that delighted us—the ship was nearly thrown upon the quay. The rain now poured a deluge, and the apparent mill-pond of a harbour was soon covered by long

rolling waves, the crests of which were cut off in foam. Every boat in the port was either swamped or capsized; oars, rudders, and thwarts were floating on every side, and the vessels along the marina were driven one upon the other. . . . The mischief done on shore was much greater than that afloat; numbers of trees were torn up by the roots, the roofs of houses blew away like chaff, windows and doors were forced in, and even floors were displaced by the wind getting into the lower stories."

In the Ionian Sea the prominent winter winds are from south-south-west to east-south-east, while in summer the winds blow usually from north to north-north-east; inside the islands they are extremely variable. The Gulf of Corinth is very subject to sudden squalls from the mountains; the warm and disagreeable easterly wind called by the Ionians "*Vento del Golfo*," commences a little after midnight and continues till nearly midday; the westerly breeze sets in soon after noon and lasts till nearly midnight, but almost constantly moderates at sunset. In the winter the north-east winds are prevalent and strong, especially along the Roumelia shore. The whole of the Ionian Sea is subject to intense lightning, principally in the neighbourhood of Corfu. Slightly liberated electricity produces lambent or phosphorescent flames, "*fire of Sant Elmo*" unattended with danger, and "*hanging on the trucks in the form of Medusæ* to the depth of two or three feet down the mast, with gentle oscillating flittings such as might be represented in

shaking a large jelly. The duration varies from five or six minutes to nearly a quarter of an hour in vigour, when it gradually dies off and is generally succeeded by fine weather." (Smyth.)

Such is a rough sketch, extracted from the writings of that excellent observer, Rear-Admiral Smyth, of the winds and weather of that part of the Mediterranean mostly visited by English yachts. It will be concluded that the summer, although the warmest season, is pleasant in many respects for cruising about that beautiful inland sea ; but, if in summer gales of wind and bad weather are seldom met with, the heat is often too great to be either agreeable or healthy, and the calms too frequent for a sailing vessel. It is principally in winter, however, that yachts are met with in the sunny south, and at times three or four of the noblest vessels of the Royal Yacht Squadron may be seen in the harbours of Cannes or Nice. It is not uncommon at Cannes to meet with two or three steam yachts moored to the quay, ever objects of admiration from both the native population and the British colony. Sometimes the owner sails out from England, but usually the yacht is joined at Marseilles, Cannes, or Nice. A cruise is first undertaken either to the Islands of Corsica and Sardinia, and then along the coast of Italy to Sicily and Malta ; or the French and Italian Riviera are visited, calling at Nice, Monaco, Mentone, San Remo weather permitting, until Genoa is reached ; and it will be worth while prolonging the cruise from Sicily across the Ionian Sea to the Ionian Islands and Greece.

Indeed nothing in my estimation can be more pleasant than a winter spent on the Mediterranean on board a roomy and well-found sailing yacht, and in the company of intimate friends.

It may be concluded that from the direction of the wind and the look of the sky, coupled of course with the readings of the barometer, the weather may be fairly anticipated during a Mediterranean cruise. The north-west and westerly winds, within a moderate distance of the north-east coast, usually bring fine, clear weather, and the north-east, east, and south-east winds are attended with rain and thunder storms, lightning and thunder being visible especially in the south. The air will be warm and pleasant in the sun, though chilly after sunset, while the coast, bristling with rocks and crags, and dotted with nooks and coves, affords the most picturesque views that may be conceived. The shores, seen from land, are very interesting, though much less beautiful than when viewed from the sea, as very little of the Riviera sea-side is visible while travelling by land along the coast, the railway passing through some fifty tunnels between Cannes and Genoa. It is well worth while to take a passage on board one of the steamers plying from Nice to Genoa, should the weather be fair and calm, and thus enjoy the opportunity of seeing some of the finest parts of the Riviera and Corniche coast. The trip only lasts eight hours, and continues to be, I presume, during the day, while that by sea from Genoa to Leghorn has always been at night, which,



of course, is not conducive to the contemplation of nature.

It need hardly be stated that invalids who make up their mind to a cruise on the Mediterranean in search of health must not be liable to sea-sickness, or must know by experience they will very soon overcome it. They should also belong to that class of people who like the sea, as the mode of living on board ship, and the want of room for moving about, invariably experienced even on the largest yachts and passenger steamers, may feel irksome before many days have elapsed. Those who will derive most benefit from a winter spent on a Mediterranean cruise are persons whose nervous system is debilitated, if not more seriously affected by excessive brain work. Should they select some of the Mediterranean health resorts, they will be much less likely to obtain that complete rest of mind and body to be found on board a yacht. Opportunities, moreover, will offer by such means of visiting coasts and islands but little known, and the facilities yachting affords for calling at any place likely to be of interest cannot fail to add greatly to the enjoyment of the cruise. Ladies whose nervous system is weakened by care or anxiety, or from the fatigue of social intercourse, and those who want rest after keeping up an extensive establishment and entertaining a large circle of friends, will find a winter cruise on the Mediterranean the best and most enjoyable means of recruiting their strength. There are, moreover, cases of functional disturbance of the nervous

system, which might come under the name of hysteria, likely to derive much benefit from a sea voyage; and the Mediterranean affords every convenience in this respect. Ladies can be conveyed, it might be said, from their bedroom to the Mediterranean coast, travelling from Calais to Cannes without changing carriage;\* and then find themselves on board a comfortable yacht, after perhaps years of confinement in their apartments. Day after day they breathe the balmy sea air on deck, sheltered from the sun by a spacious awning, and soon become conscious of returning health, strength, and energy.

Of all constitutional affections, I think none so likely to benefit from a sea voyage as an unsatisfactory state of physical development often met with in children. The prominent feature in most of these cases is a softness of the bones, making them liable to bend under the weight they are meant to carry. Either the spine is not quite straight, or the arm and forearm have become somewhat curved; the joints want firmness, while the muscles are more or less impeded in their natural function. Dr West, now settled in winter at Nice, gives in his excellent book 'On Diseases of Infancy and Childhood,' a very true account of this constitutional disorder of infancy, and observes that it is commonly at the period of weaning, or when, with the diminution of the supply of the mother's milk, artificial food is first had recourse to,

\* This last winter passengers for Cannes could leave London at 9.40 a.m., and reach Cannes next day at 3.34 p.m., or in 32 hours.

that the earliest symptoms appear. There will be found, moreover, retarded ossification of the skull, enlargement of the wrists, and thickening of the ends of the ribs, coupled with the commencement of the pigeon-breast deformity of the chest.

These cases do extremely well either at sea or at the seaside, and a daily sail from Cannes to the "Iles Lerins," or the mere fact of spending two or three hours at sea daily, will in the long run probably do more than any other means to effect a permanent cure.

Sea voyages are beneficial in the earliest stage of consumption, but as soon as the disease has assumed what is called an active form, this mode of treatment will prove useless, and indeed ought not to be attempted. I question, however, whether a permanent cure of phthisis can be expected from such means, although in favorable cases a sea voyage may assist materially towards it.

✓ Dr C. T. Williams, in his useful and practical book on 'The Influence of Climate in Pulmonary Consumption,' from a careful analysis of cases under Dr C. J. B. Williams' care, shows the benefit to be expected from a sea voyage by consumptive patients. It is obvious that those cases likely to do best at sea have been carefully selected, as 72 per cent. were in the first stage of consumption, which would be the most promising for a treatment of this kind. Dr Williams' experience, however, applies to sea voyages to distant lands, such as Australia, New Zealand, or America or the West Indies; he expresses as follows

the result of these observations: "89 per cent. of the patients improved,  $5\frac{1}{2}$  per cent. remained stationary, and  $5\frac{1}{2}$  per cent. became worse. This, is the most favorable of our climatic experiments." A Mediterranean cruise is not, however, quite the same thing as a voyage to Australia or New Zealand, over which it has the advantage of affording opportunities of breaking a long monotonous voyage by going ashore every few days and visiting towns and places likely to be of interest. I cannot help thinking that as regards health, this occasional interruption to a sea voyage may in many cases prove beneficial, care being taken, of course, not to land in unhealthy districts.

It is very difficult to express an opinion as to the usefulness of a sea voyage for the treatment of asthma, which may or may not answer the purpose. Asthmatic patients mostly know from experience whether the seaside suits them or not; if it does, I should think they would be likely to benefit from a Mediterranean cruise. There is, however, the question of cabin accommodation on board ship, which may prove extremely disagreeable to such persons, as I have mostly observed that people liable to attacks of asthma have a horror of small rooms, and make a point to select large and lofty bed-rooms in hotels. How these same invalids would put up with a ship's cabin and its low ceiling and stuffy atmosphere I am not prepared to say.

## CHAPTER V

THE CLIMATE AND WEATHER AT CANNES, AND GENERALLY  
OF THE FRENCH AND ITALIAN RIVIERA, THROUGHOUT  
THE SIX MONTHS OF THE WINTER SEASON

THE main character of the climate of the Riviera is a high temperature during the six winter months, or from November to the end of April, compared with that of England, exceeding the mean daily records at Greenwich for that same period by  $9^{\circ}$  or  $10^{\circ}$ , while December, January, and February with a mean temperature of  $48.1^{\circ}$ \* at Cannes are warmer by  $8.3^{\circ}$ . The mean temperature at Cannes at the seaside, from my six seasons' observations (November to April inclusively), is  $50.8^{\circ}$ , while Dr de Valcourt, from observations he has recorded during three years, or from 1865 to 1868, finds a mean temperature of  $50.7^{\circ}$  for the corresponding months,† both results being as near as possible the same. This gentleman has continued his observations with much perseverance, and they are published weekly throughout the season in the local newspaper, the 'Indicateur de Cannes.' The atmosphere on the Riviera is drier than in

\* With season 1879-80 corrected for seaside.

† 'Cannes: son Climat et ses Promenades,' par le Dr de Valcourt.

England, and the sun shines with a power unknown in winter in Great Britain, while there is an absence of fogs under that privileged sky. It is remarkable, indeed, that Cannes, in latitude  $43^{\circ} 33' N.$ , should be for the three coldest months of the year, warmer than Florence (lat.  $43^{\circ} 41'$ ) by  $4.3^{\circ}$ , than Pau (lat.  $43^{\circ} 17'$ ) by  $5.6^{\circ}$ , and Pisa (lat.  $43^{\circ} 48'$ ) by  $2.1^{\circ}$ , the four towns being nearly in the same latitude. This shows clearly the influence of the immediate neighbourhood of a warm sea, and efficient shelter from the north wind.

During two out of the three winters I spent at Nice, and my next six winters at Cannes, I kept daily records of the weather. While at Cannes the number of my observations became considerably increased, and I noted down every day at 9 a.m., 2 p.m., and midnight, the state of the sky, the direction and force of the wind, and the readings of a barometer; dry- and wet-bulb thermometers yielded the relative atmospheric humidity, and a rain-gauge the amount of rainfall. The readings of maximum and minimum thermometers under a screen, and of a minimum thermometer on the grass, were recorded daily, and the temperature of the surface of the sea was taken every twenty-four hours. The result of these observations has been published in the 'Journal of the Meteorological Society' for 1877 and 1882.\*

I cannot do better, in order to give a summary account of the average weather at Cannes during the

\* "Contribution to the Meteorology of Cannes," 'Jour. Meteorological Society,' 1877. "On the Meteorology of Cannes," 'Jour. Met. Soc.,' 1882.



season, than subjoin the mean number of days, fine, overcast, and rainy, in every month, from November to April inclusively, extracted from my tables.\*

				Per cent. on 181 days.
Days—Fine . . .	117	...	65	per cent.
Overcast . . .	16·6	...	9·2	„
Rainy . . .	47·1	...	26	„

Therefore considerably over one half the number of days were fine, warm, and pleasant, with a clear, bright sun and few clouds; many were cloudless, or all but so; indeed, it not unfrequently happens that fine days follow one another so uninterruptedly and for so long, that rain is very welcome when at last it comes. By overcast weather is meant a complete absence of blue sky for most of the twenty-four hours, without rain. The rainy days include all those on which rain fell, whether in small or large quantity, although a few drops not measurable in the rain-gauge were disregarded as constituting such a day. A light shower, with the weather clearing up immediately afterwards, is entered as a wet day, so that the forty-seven rainy days give but a very imperfect idea of the number of actually wet days on which it was not possible to go out of doors; roughly speaking, I should think absolutely bad days barely amounted to four or five in number throughout the whole season.

The Riviera is thought by some to be too windy for either health or comfort, but the winds are felt mostly

\* These tables include the observations during two seasons at Nice and six seasons at Cannes.

at the immediate seaside, and sheltered inland places escape them in a great measure. It is very difficult to give a correct idea of the distribution of the winds with reference to their force and direction, as they vary to a considerable extent even throughout the daytime, and the state of the atmosphere at night is usually different from what it has been during the day. I found the direction of the wind too changeable to be worth recording in my tables; the *force* of the wind was numbered in my journal: 1 to 5 for light to fresh, and 6 to 10 for strong to a gale. By noting the force of the wind daily at 9 a.m., 2 p.m., and at or near midnight, I was able to show that it was distributed as follows throughout the twenty-four hours during the two seasons, 1877—78 and 1878—79.

*Number of days.*

	Calm.			Light to fresh.			Strong to a gale.		
	9 a.m.	2 p.m.	Midnight.	9 a.m.	2 p.m.	Midnight.	9 a.m.	2 p.m.	Midnight.
1877-78	105	25	119	65	112	51	11	30	11
1878-79	95	39	109	62	110	60	24	32	12
Mean	100	32	114	63·5	111	55·5	17·5	31	11·5

It is interesting to remark that the air was calm at 9 o'clock in the morning on as many as 100 out of the 181 days of each season; while the nights were also mostly calm, or with a light northerly breeze, as there were 114 calm nights, and only 11·5

with wind strong to a gale. A breeze, from light to fresh, blew on 63 days at 9 a.m., and 111, or nearly double the former number, at 2 p.m. A similar remark applies to the wind, strong to a gale, which prevails to a considerable extent in the afternoon; seldom blowing at night, and met with only on 17·5 days in the morning. The breeze from light to fresh recorded on 55·5 nights was mostly the light northerly land breeze setting in after sunset.

Observations continued during four seasons show the mean state of the atmosphere with reference to calms and winds throughout each of the six winter months. These agree rather closely with Monsieur Teysseire's records for twenty years at Nice,\* as far as *strong* winds, or winds *strong to a gale* are concerned, which is seen to be the case in the following table :

		Wind strong to a gale.	
		Monsieur Teysseire's observations. 20 seasons at Nice.	My own observations. 4 seasons at Cannes.
November	. . .	6·5	6·2
December	. . .	5·3	5·7
January	. . .	6·1	5·5
February	. . .	8·2	7·2
March	. . .	10·2	8·8
April	. . .	9·8	8·5
		46·1 days.	41·9 days.

As remarked on a previous occasion, the north-east, east, and south-east winds are wet, or usually bring on rain, while the westerly, and especially the north-west wind is peculiarly dry. Strong south winds are

\* 'Vingt ans d'Études Météorologiques faites à Nice,' 1849—1868.

usually attended with storms at sea, accompanied by lightning and thunder. After a succession of wet days it often happens that a thunderstorm in the south heralds the return of fine weather.

A strong mistral or north-west wind is signalled out at sea, some time before it reaches the coast, by the appearance of a line of breakers rounding the "cap Roux," and gradually moving on while leaving behind a sea covered with foam. Less than half an hour later clouds of dust roll along the high roads, and the eucalyptus bends with the commencing gale. The wind soon veers to the north-west, and the Bay of Cannes, then sheltered, in a great measure, by the Esterel mountains and coast, exhibits a multitude of short seas chasing each other, while their crests are blown into a fine dust driven before the gale. A short time after the mistral has set in, a heavy swell appears in the harbour, and it is curious to witness the ships moored alongside the quay, rising and falling in succession as the mighty wave reaches each of them in turn.

I have preserved notes of many "mistral" gales; those subjoined record an interesting phenomenon with which one of them was accompanied.

February 16th, 1879, 9 a.m.—Fine morning, calm; very heavy breakers at sea all night, and barometer falling. Between 11 and 12 o'clock a strong mistral rose from the west with an overcast sky, its strength being indicated by 7 (maximum 10) at 2 p.m. About 6 o'clock that evening the wind fell, but rose again

moderate, and at 11.40 p.m. was recorded as 3, north north-west. Fine clear night, bright stars, no dew ; barometer still falling.

February 17th, 9 a.m.—Mistral continues (strength 6), about half the sky covered with clouds. 2 p.m.—Wind very high, fine afternoon. At 8.35 p.m. I observed the singular phenomenon of a heavy shower of rain on a bright starlight night ; a strong blast of cold northerly wind now felt ; sky dark at northern horizon. The rain lasted about twenty minutes, and the dark cloud at horizon cleared away. At 12.15 night sky cloudless.

February 18th, 9 a.m.—Barometer has fallen to 29.346. Beautiful morning, all but cloudless ; gale continues (8) after blowing all night. At 2 p.m. no change in the wind ; fine afternoon. Twenty minutes after midnight weather very fine ; gale very high.

February 19th.—The gale continued all night, and is unchanged this morning ; weather beautifully clear. 2 p.m.—Barometer rising rapidly and wind veering to the north. It fell in the course of the evening, the night was very fine, and half an hour after midnight a moderate northerly breeze was recorded.

There was another north-westerly gale, on the 23rd of February, or four days later, following heavy rain, and also attended with a remarkable fall of the barometer, which on that day, at 9 a.m., registered 28.980 inches. My note of the 23rd at 9 a.m. runs thus :—A gale last night, stronger than any reported yet, with thunder and lightning. After

subsiding it rose again in the morning, blowing northerly (9). Between 8 and 9 a.m. some rain fell, which is unusual with the mistral, but at 9 o'clock the sky was clearing up. Barometer never been so low at Cannes within my knowledge. The gale continued all day and fell about 8 o'clock in the evening; at 2 o'clock the barometer had already begun rising.

The following is an illustration of a short but violent south-easterly gale. A cable message, published in the 'Times,' April 3rd, was received from New York at the London office of the 'New York Herald,' running thus:—"Cyclonic storm moving north-eastward, will arrive at the British, Norwegian, affecting French coast between the 4th and 6th, preceded and attended by heavy rains, gale, lightning," &c.

At Cannes, 6th April, my notes were as follows: 2 p.m.—Fine afternoon, wind south (4). 11.30, night, sky overcast, heavy clouds, calm, very slight dew.

April 7th, 9 a.m.—Very bad weather, raining; Esterel hills hid behind a thick rain-mist, wind south-east (6), a marked fall of the barometer. The weather continued very bad all day, with very high waves at sea.

April 8th, 9 a.m.—A hurricane began last night at 1 a.m., east by south, with torrents of rain, abating some hours later, and by 9 a.m. it was over.

The sea at Cannes, with southerly gales and wet weather, occasionally loses its blue colour and



becomes quite dark from the mass of mud carried down by the mountain streams, such as "La Siagne" and "le Rioux;" a similar phenomenon being observed at Nice, where the "Paillon" joins the sea, and at the mouth of the river "Var," a few miles west of that town. I find the following record in my journal for the 21st April, 1879. 9.30 a.m. — Raining, Esterel hills nearly invisible in the rainy haze, heavy seas. 2 p.m. — Has been raining throughout the morning, Esterel clearing up, blue patches in the sky. At twenty minutes to 4 p.m. a strong south south-west wind rose suddenly, and the sea became quite muddy over an area extending southerly from my house, and from thence to the Esterel hills, covering perhaps a surface of about fifteen miles; the muddy zone extended as far as the eye could reach, and was very distinctly mapped out on the clear blue water.

The mean number of rainy days, or of days on which a measurable amount of rain fell, was as follows:

November . . . .	9·5
December . . . .	8·8
January . . . .	6·3
February . . . .	5·3
March . . . .	7·1
April . . . .	8·6

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45·6\*

The mean number of days on which rain falls in London (89·5 Strachan) is just about twice that at

\* Dr de Valcourt gives 38 for the mean number of wet days, and estimates the rainfall at 20·77 inches during the six winter months.

Cannes during the corresponding winter months, but while the amount of rainfall at Cannes amounts to 20·3 inches, in London it equals only 10·8 inches, or about half. This appears remarkable considering the acknowledged superiority of the winter climate on the Riviera; but while a slight continued rain is common in England for days in succession in autumn and winter, such is not the case at Cannes, where rain mostly comes down heavily or not at all. While at Cannes the mean number of overcast days for the winter months is only 16·6, in London the sky is commonly hid behind the clouds throughout December, January, and February.

The amount of rainfall at Cannes may vary considerably from one season to another, as will be seen by the following figures :

*Rainfall at Cannes.*

1876—77	.	.	.	20·469 inches.
1877—78	.	.	.	17·426 „
1878—79	.	.	.	32·918 „
1879—80	.	.	.	10·432 „
Mean				<hr/> 20·31 „

It follows that three times more rain may fall in one season than in another, and the obvious conclusion is that the weather varies to a great extent, showing the difficulty if not the impossibility of predicting what it is likely to be for the season.

The mean rainfall at Cannes for the four seasons 1876-77 to 1879-80 was :

November	.	.	.	5·17 inches.
December	.	.	.	4·51 „
January	.	.	.	1·69 „
February	.	.	.	1·46 „
March	.	.	.	3·42 „
April	.	.	.	4·05 „
				<hr/>
Total rainfall	.	.	.	20·30 „

It is said with truth that fogs are unknown at Cannes. When bad weather is about to set in, dark clouds frequently top the Esterel hills in the west, and those hills may be enveloped in a thick Scotch mist before rain actually falls in the town ; the same may be said of the “Lerin Islands,” though on very rare occasions. Such a mist is invariably the fore-runner of rain, and during or just before heavy rain the Esterel actually may disappear from sight. No actual fog, however, reaches Cannes ; the nearest approach I have seen to it being a slight condensation of vapour at the surface of the warm sea near the coast, in the cool of the evening.

I shall now beg to consider each successive month throughout the season with reference to its weather.

*Observations for November.\**

Weather.	Winds.	Temperature.			
		Mean maximum. Sun.	Air.	Mean lowest on grass.	Mean of sea.
Fine, 17·5 days.	Calm, 10·7 days.		9 a.m., 52·8° 2 p.m., 57·1° Midnight, 52·2°		
Overcast, 2·1 days.					
Rainy, 9·5 days.	Light to fresh, 12·7 days.	99·7°	Maximum, 58·8° Minimum, 46·5° Mean, 52·6°†	38·4°	61·0°
Rainfall, 5·17 inches.			—		
Relative humidity, 71·2 per cent.	Strong to gale, 6·2 days.		Mean at Green- wich, 42·8°		

*November.*—On the 1st the sun rises at 6 h. 41 m. and sets at 4 h. 45 m.‡ The autumn begins with bad weather and thunderstorms, commencing in October;

\* My observations extend to the following number of seasons:

8 seasons for days fine, overcast, and rainy.

4 „ for amount of rainfall.

6 „ for mean relative humidity.

2 „ for mean daily maximum solar radiation.

6 „ for temperature of the air at 9 a.m. and midnight.

4 „ „ „ 2 p.m.

6 „ „ maximum and minimum.

4 „ „ minimum on the grass.

6 „ „ of the sea.

† The mean temperatures corrected for the seaside, as the observations of one season were made about 80 feet above the sea, should be nearly 0·4° higher, the corrected figure for November being 53·0°.

‡ Mr R. Strachan has had the kindness of calculating for me astronomically the mean time of the true rising and setting of the sun at Cannes for the first day of the months during the winter season.

the weather is hot and sultry, and the sun still feels very powerful. November shows the smallest mean number of fine days for the season, amounting to 17·5, and includes, together with April, the greatest mean number of wet days, or 9·5. During the four seasons, 1876-77 to 1879-80, there was a mean number of 10·5 rainy days in November on which 5·174 inches of rain fell, which is the greatest monthly rainfall of the whole season. These early rains are very beneficial; besides promoting vegetation, which is then much in want of water, they cleanse the towns and make them healthy for visitors. Indeed, Cannes and Nice are sadly in want of an occasional thorough drenching, as some of the streets inhabited by the native population become so foul in dry weather, that it is sickening to go through them. During the four seasons I kept records of the rainfall at Cannes, the amount of rain which fell in November varied from 3·17 inches, with nine rainy days in 1879, to 7·15 inches, and fourteen rainy days in 1878. It is true that the whole season, 1879-80, was extremely fine, with only thirty-three rainy days and 10·4 inches of rainfall, while that immediately preceding it (1878-79) was comparatively bad, showing seventy-six rainy days, and 32·9 inches of rainfall.

Although the weather is so unsettled in November, that month is not particularly windy, as it exhibits 10·7 calm days against 2·7 in April, and 12·7 days with wind light to fresh against 19·2 in March. November would be therefore a pleasant month to sail

about on the Mediterranean; although one might expect 6·2 days with wind strong to a gale, which, however, is much less than might be looked for in March and April.

The mean temperature of the atmosphere in November in the shade,  $52\cdot6^{\circ}$ , is considerably higher than in London (Greenwich), as it exceeds that temperature by  $9\cdot8^{\circ}$ . The difference with the British climate is indeed at once very striking on reaching the Mediterranean coast, at the beginning of the season. The mean greatest daily heat of the direct sun's rays for that month is  $99\cdot7^{\circ}$ , which, however, ought not to convey the same impression as if a person was submitted to that temperature, as the atmosphere abstracts a certain proportion of the heat from all bodies, both animate and inanimate, with which it may come into contact. The thermometer registering  $99\cdot7^{\circ}$  is in a space free from air and therefore cannot lose any heat by atmospheric conduction. The temperature remains high enough throughout the night to be quite comfortable, registering  $52\cdot2^{\circ}$  at midnight and falling to  $46\cdot5^{\circ}$  for a very short time only just before sunrise. It will be found, however, that a blanket has become very necessary on one's bed, and perhaps a blanket and a woollensawl, not so much because of the fall of temperature as on account of the dryness of the atmosphere. While in England on winter nights the air is nearly saturated with moisture, at Cannes the relative humidity amounts, in November, to a mean of 74·0 per cent. at midnight; this dry state of the air (which is



driest at night for the whole season) is of course felt in doors as well as out of doors, creating a considerable evaporation from the skin and lungs during sleep, and thus producing a sensation of cold. As the season progresses, the air becomes in a general way more and more damp at night, and in April the relative humidity at that time has increased to 80·1 per cent.

The mean lowest temperature on the grass at night, or that of the soil, after losing its heat by radiation, is 38·4°. This tells more upon vegetation than on the human being, and the care usually taken to cover up with manure, in October, the ground previously sown with grass and other seeds, must act very beneficially in retaining the heat absorbed by the soil throughout the summer.

The temperature of the sea (61°) is quite high enough in November for sea bathing, indeed, up to 60° the sea will be found very pleasant. It may be observed that the sea, in November, is warmer than the air by 8·7°, and no doubt that this circumstance assists very materially in checking the fall of temperature of the atmosphere at night.

*December.*—On the 1st December the sun rises at 7 h. 19 m., and sets at 4 h. 19 m. The weather has not yet assumed its unceasing bright aspect of January and February, but is somewhat finer than in November, as its average number of fine days equals 18·8 instead of 17·5 in November; the number of rainy days and amount of rainfall are also rather less, being 8·8 against 9·5 for the wet days, and 4·51 instead of

5·17 inches for the rainfall. The atmospheric relative humidity is a trifle higher than in November. Thunderstorms and heavy rains are again met with in the course of this month; towards its termination the weather becomes cooler, especially at night, and mosquitoes disappear.

*Observations for December.*

Weather.	Winds.	Temperature.			
		Mean maximum. Sun.	Air.	Mean lowest on grass.	Mean of sea.
Fine, 18·8 days.	Calm, 11·7 days.	91·6°	9 a.m., 45·7°	31·4°	57·1°
Overcast, 3·5 days.			2 p.m., 50·8°		
			Midnight, 47·0°		
Rainy, 8·8 days.	Light to fresh, 13·5 days.	91·6°	Maximum, 52·5°	31·4°	57·1°
Rainfall, 4·51 inches.	Strong to gale, 5·7 days.		Minimum, 40·1°		
Relative humidity, 72·7 per cent.			Mean, 46·3°		
			Mean at Green- wich, 40·7°		

The winds in December are much the same as in November, and show the same squally character. There is a slight increase in the number of calm days—11·7 instead of 10·7, and we observe 13·5 days on which the wind was light to fresh instead of 12. The wind strong to a gale is lessening somewhat in frequency, being met with on 5·7 days instead of 6·5

in November. Altogether there is in December a decided improvement over the weather in November.

The temperature in December shows a steady decline compared to that of November, the mean highest in the sun's rays being  $91.6^{\circ}$  instead of  $99.7$  in November, and the mean of the atmosphere in the shade  $46.3^{\circ}$  ( $40.7^{\circ}$  Greenwich) instead of  $52.3^{\circ}$  in November. The coldest mean temperature registered at night is  $40.1^{\circ}$  instead of  $46.5^{\circ}$  in November. The mean temperature of the sea is also less, and falls in December to  $57.1^{\circ}$ , from  $61^{\circ}$  in November. The sea has now become rather cold for bathing, and from the beginning of this month the bath-houses on the sea shore become deserted, although a few English visitors take an occasional dip on very fine days. Christmas is often a very beautiful, clear, and balmy day, as by that time the fine weather usually becomes settled. December may prove much colder than might be expected from its mean temperature. On the 1st of that month in 1879, when rising in the morning, everybody at Cannes was surprised to see the landscape covered with a light sprinkling of snow, which, however, very shortly afterwards disappeared. It had been preceded by a thunderstorm and very heavy rain (one inch) that same night, causing a considerable landslip at a villa opposite my own, when a wall and the terrace it supported were carried away. This first cold night inaugurated a cold month of December, a remarkable fall of temperature being observed at the same time everywhere else in Europe.

That month at Cannes a mean minimum temperature of  $31\cdot7^{\circ}$  was registered, which is much the lowest recorded for six seasons, from 1874 to 1880. The next coldest month of December was in 1878, with a mean minimum of  $38\cdot8^{\circ}$ , while the highest mean reading of the minimum thermometer in December was in 1876, when it reached  $47\cdot5^{\circ}$ .

*Observations for January.*

Weather.	Winds.	Temperature.			
		Mean maximum. Sun.	Air.	Mean lowest on grass.	Mean of sea.
Fine, 21·0 days.	Calm, 12·5 days.	96·1°	9 a.m., 46·9°	32·2°	55·7°
Overcast, 3·8 days.			2 p.m., 52·2°		
			Midnight, 45·8°		
Rainy, 6·3 days.	Light to fresh, 13·0 days.	96·1°	Maximum, 54·0°	32·2°	55·7°
Rainfall, 1·69 inches.	Strong to gale, 5·5 days.		Minimum, 42·0°		
Relative humidity, 71·7 per cent.			Mean, 48·0°		
			—		
			Mean at Green- wich, 38·9°		

*January.*—On the first of January the sun rises at 7 h. 39 m. and sets at 4 h. 28 m. We now enter the usual period of settled fine weather on the Riviera, with no less than twenty-one fine days for that month. This is really the time to enjoy the Mediterranean climate, and those who mean to pay the south of France a winter visit should not delay setting out.

The number of rainy days falls from 8·8 in December to 6·3 in January, and the rainfall is really quite insignificant, measuring only 1·69 inches, instead of 4·51 in the preceding month. The atmosphere, moreover, exhibits a slight decrease of relative humidity. A greater regularity is now observed in the winds; the air is calm at night, or the light northerly land breeze beginning at sunset, continues till early morning, when it drops. About 10 o'clock in the morning a breeze rises from the south-east, veering to the south and blowing in the afternoon from the south-west, though seldom stronger than from light to fresh.

I have on record a mean of 12·5 calm days in January, 13 with wind light to fresh, and 5·5 strong to a gale. High winds in January and February not unfrequently blow from the north-west, although they appear, to a person on the seaside at Cannes, to come from the west. A mean of 5·5 days for strong winds or gales, figures as the lowest record for the whole of the six months.

The mean temperature of the air in the shade in January is rather higher than it is in December, being  $48\cdot0^{\circ}$  in January and  $46\cdot3^{\circ}$  in December; the correctness of this observation is borne out by the heat registered for the direct solar rays, which is  $91\cdot6^{\circ}$  in December and  $96\cdot1^{\circ}$  in January. This is probably owing to the sun's heat being absorbed in a greater degree by clouds in December than in the clear and fine month of January. The mean temperature at Greenwich for January is  $38\cdot9^{\circ}$ .

The temperature of the sea ( $55\cdot7^{\circ}$ ) continues falling in January, nearly attaining in the course of that month its lowest winter limit, which is  $55\cdot5^{\circ}$  in February.

During January, balls, evening parties, and private theatricals are in great force at Cannes, and continue till the end of February, while picnics, boating excursions, and lawn tennis are amongst the favourite outdoor amusements.

*Observations for February.*

Weather.	Winds.	Temperature.			
		Mean maximum. Sun.	Air.	Mean lowest on grass.	Mean of sea.
Fine, 20·0 days.	Calm, 8·2 days.	106°	9 a.m., 47·1°	33·8°	55·5°
Overcast, 3·1 days.			2 p.m., 54·1°		
			Midnight, 47·5°		
Rainy, 5·3 days.	Light to fresh, 11·7 days.		Maximum, 55·5°		
Rainfall, 1·46 inches.	Strong to gale, 7·2 days.		Minimum, 42·1°		
Relative humidity, 75·0 per cent.			Mean, 48·8°		
			Mean at Green- wich, 39·7°		

*February.*—The sun rises at 7 h. 23 m. and sets at 4 h. 5 m. This month again exhibits a great number of fine days, amounting to twenty, or only one less than in January. The number of rainy days becomes reduced to 5·3 from 6·3 in January, while the rainfall is also a



trifle less, registering 1.46 inches instead of 1.69. There is, however, a decided increase in atmospheric relative humidity, which reaches to 75 per cent. instead of 71.7 per cent. in January; indeed, this is the month attended with the mean highest relative humidity for the whole season, and, singularly enough, it exhibits the smallest rainfall.

On February 17th, 1875, at 10.30 a.m., there was a hailstorm with thunder; snow began to fall at 6.45 p.m. that same day, attended with lightning and thunder, and by 11.30 p.m. there was at least an inch thick of snow on the high road, while snow was still coming down. The next morning snow and rain set in together, and the country exhibited the unusual appearance of a real winter landscape. The phenomenon was remarkable from its being accompanied by lightning and thunder.

The winds are decidedly increasing in February, as we observe only 8.2 calm days instead of 12.5 in January, and the days on which the wind was strong to a gale numbered 7.2 instead of 5.5; there are about the same number of days with a breeze light to fresh. A blow of the mistral is not uncommon during this month.

The temperature of the sun's rays in February ( $106^{\circ}$ ) is decidedly higher than in January ( $96.1^{\circ}$ ), but the atmosphere is only a trifle warmer, showing a mean of  $48.8^{\circ}$  instead of  $48^{\circ}$ . The mean temperature at Greenwich for that month is  $39.7^{\circ}$ . At midnight the thermometer registers a mean of  $47^{\circ}$ , or as near as

possible the same temperature as at nine in the morning. The nights, however, feel cool, and two blankets, with perhaps an additional shawl, on one's bed may be none too much. The lowest temperature at night just before sunrise is  $42.1^{\circ}$ . It must be recollected, however, that a bedroom retains much of the warmth it has acquired from the sun during the day, and even without a fire it will be much warmer at night than the external air.

The mean temperature of the sea reaches its lowest point in February, registering  $55.5^{\circ}$ ; still it is higher than the mean temperature of the air by  $7^{\circ}$ , and therefore continues to assist in preserving the warmth of the atmosphere at night.

*Observations at Cannes for March.*

Weather.	Winds.	Temperature.				
		Mean maximum. Sun.	Air.	Mean lowest on grass.	Mean of sea.	
Fine, 21·3 days.	Calm, 3 days.	114·7°	9 a.m., 51·9°	35·4°	56·7°	
Overcast, 2·6 days.			2 p.m., 55·5°			
			Midnight, 48·5°			
Rainy, 7·1 days.	Light to fresh, 19·2 days.		Maximum, 57·6°			
Rainfall, 3·42 inches.	Strong to a gale, 8·7 days.		Minimum, 44·4°			
Relative humidity, 73·1 per cent.			Mean, 51·0°			
			Mean at Greenwich, 41·5°			

*March.*—The sun rises at 6 h. 41 m., and sets at 5 h. 43 m. March exhibits the highest mean number of fine days for the whole season, amounting to 21·3; but the spring season is setting in with heavy showers, and 7·1 rainy days are recorded instead of 5 in February, while 3·42 inches of rain fall instead of 1·46; these showers are usually of short duration, and the sun returns with all its southern power as soon as the rain is over.

The winds are freshening, and the calm days have now fallen to only 3 in number, while those light to fresh have risen to 19·2. There is, moreover, an increase in the number and violence of the gales and high winds recorded, on a mean of 8·7 days; no doubt but that March and April are the two windiest months of the season. They should not on that account frighten visitors away, as they are really not very trying, and, moreover, winds in that season prevail nearly everywhere. For people who have a particular dislike to windy weather, there are many sheltered spots to be found on each of the health resorts of the Riviera. In that month nature wakes up afresh and wild flowers appear in profusion. The pretty blue and red anemones are common in the wheat fields, while primroses are gathered near the streams; violets, daffodils, and narcissus under the olive trees impart fragrancy to the atmosphere, and later in the season the graceful pink gladioles are common on the hills sides.

The temperature of the atmosphere is now quickly

rising, the mean reading in the solar rays being  $114.7^{\circ}$  against  $106^{\circ}$  in February, while the atmosphere in the shade registers  $51^{\circ}$  instead of  $48.5^{\circ}$ . The surface of the sea is also becoming warmer, showing  $56.7^{\circ}$  against  $55.1^{\circ}$ .

*Observations for April.*

Weather.	Winds.	Temperature.			
		Mean maximum. Sun.	Air.	Mean lowest on grass.	Mean of sea.
Fine, 18·4 days.	Calm, 2·7 days.	120·7°	9 a.m., 56·9°	41·9°	59·3°
Overcast, 1·5 days.			2 p.m. 60·6°		
			Midnight, 53·9°		
Rainy, 8·6 days.	Light to fresh. 18·5 days.		Maximum, 62·0°		
Rainfall, 4·05 inches.	Strong to a gale, 8·5 days.		Minimum, 49·1°		
Relative humidity, 74·3 per cent.			Mean, 55·5°		
			Mean at Green- wich, 47·2°		

*April.*—The sun rises at 5 h. 44 m. and sets at 6 h. 23 m. The showery and windy weather commencing in March continues in April. The number of fine days falls from 21.3 in March to 18.4, and there are 10 rainy days in this month instead of 7. The rainfall, however, increases but slightly, measuring 4 inches instead of 3.4.

April only shows a mean of 2.7 calm days. The breeze is light to fresh on 18.5 days, while the winds

are recorded as strong to a gale on 8·5, or the same number of days as in March. These two months are therefore more likely to be employed in exploring the woods and glens in the neighbourhood, and taking long walks in sheltered places, than in lounging along the seaside or indulging in the pleasure of boating; this is, indeed, hardly the time for cruising on the Mediterranean, at all events, rough weather must be prepared for.

The atmospheric temperature continues rising in April, and while in March it had reached a mean of  $51^{\circ}$ , in April it is found to register a mean of  $55\cdot5^{\circ}$  with a maximum of  $62\cdot0^{\circ}$ . The direct sun's heat is also greater; its mean daily highest temperature being  $120\cdot7^{\circ}$  against  $114\cdot7^{\circ}$  in March. April, indeed, feels occasionally somewhat too warm after the 15th, and from that date people begin to forsake the Riviera. It is, however, a mistake for those in good health, and also for many invalids, to hurry away before the beginning or middle of May, as April and May are pleasant in many respects on the Mediterranean coast, and the weather in England cannot be considered safe for people who have wintered south for the treatment of some pulmonary affection, before the middle or end of May. There is a class of patients, however, liable to certain pulmonary accidents, which will be considered hereafter, who should not remain on the Riviera after the 15th of April, on account of the increasing heat.

The temperature of the sea is also rising, and its

mean for the month attains  $59\cdot3^{\circ}$ , while in March it was only  $56\cdot7^{\circ}$ . From the middle of April sea bathing commences, and those who remain on the Riviera later on in the spring will enjoy it thoroughly. Nothing is so pleasant as a bath on the sandy beach of Cannes, although it is to be regretted that the establishments for sea bathing do not admit of greater privacy. A long wooden structure with a pavilion in the centre is erected upon iron supports so as to be on a level with the promenade or "parade." Access is obtained into it over a short bridge, and there bathing costumes and towels are lent. Side doors admit into long corridors, on which opens a row of cabins, those on one side being reserved for ladies, and those on the other for gentlemen; while a staircase leads down to the beach. A wooden pier adjoining the corridor on the men's side allows the bather to take a header in deep water.

The Mediterranean is usually considered as containing rather more saline matters than the Atlantic, and the particular blueness of its colour showing a less marked greenish hue than the Atlantic, has been ascribed to that cause (Dr Bennet). It is not my object to discuss this subject, but on consulting Mr Watt's 'Dictionary of Chemistry' I find that, although there is very nearly the same quantity of common salt in the water of both seas, the total saline matters are about 5 per cent. higher in the Mediterranean.

I have sometimes thought, while bathing at Cannes, that the body felt slightly more buoyant than in the



Atlantic ; it is indeed very striking to what extent an increased amount of saline matter dissolved in water will create a sensation of lightness of the body in the act of swimming. I had, in 1873, an opportunity of bathing in the great Salt Lake in Utah. It was in summer and the day was warm and beautiful. After encountering a real cloud of flies, which kept hovering about the shore, I stepped into the water, which was quite warm, its temperature ranging, I should think, between  $75^{\circ}$  and  $80^{\circ}$ . The bottom was soft mud, unpleasant to walk upon, and I found the water near the shore so shallow that it was necessary to wade out some distance before swimming. On plunging my head under water I first became acquainted with the effects of the large quantity of salt in the great Salt Lake, as it produced a severe smarting of the nostrils and eyes not unlike the well-known sensation from soap-suds finding their way into those same organs. Then I tried to stoop in the water as if to pick up an object at the bottom, but as soon as the body was immersed up went the legs, and it seemed impossible to sink. On swimming it was very difficult to retain the usual position, the legs being driven up and the face down. Lying on the back, however, proved quite delightful, attended, as it was, with an unmistakable sensation of having ever so many inflated bladders fastened round the body ; the bath was so pleasant, that I spent at least an hour in the water. The spot I had selected was that where the railway skirts the lake for a short

distance between Ogden and Salt Lake City ; there was no station near it, but as another person wanted to be dropped at that same place, the engine-driver most obligingly acceded to our request of being let down at a certain gate admitting to the lake shore. After my bath I walked back to the nearest station, some three or four miles off.\*

The aspect of the Great Salt Lake is peculiar from the impression of loneliness it cannot fail to create. There are no houses near it, no woods are seen skirt-ing its shores, and grass cannot grow within reach of its water ; even at some distance from the lake the stunted grass blades and their sickly yellow appear-ance told unmistakably of the effects of the brine. A few pretty ring dottrells hopped about on the

\* I beg to subjoin the composition of the water of the Great Salt Lake, determined by Mr Henry Bassett, F.C.S., from a sample I brought home in 1873 (' Chemical News,' November, 1873), also that of the Dead Sea ; together with that of the Atlantic and Mediter-ranean.

Great Salt Lake, in 100 parts, by weight.	Dead Sea, in 100 parts.	Atlantic, in 100 parts.
Chlorine ... 7·36=12·13 common salt.	Calcium ..... 0·0900 Magnesium ... 0·1938 Sodium ..... 4·7918 Potassium .... 0·6385 Sulphuric acid 0·0479 Chlorine ..... 15·4442=25·486 com- mon salt.	Lat. } solids 41·18°N. } 3·840. Long. } common salt 36·28°W. } 3·428. ' Dictionary of Chem- istry,' Watts.
Sulphuric acid ..... 0·88 Sodium..... 3·83 Potassium . 0·99 Calcium ... 0·06 Magnesium 0·30	Omitted..... 0·0237  Total residue . 24·0483 } Specific gravity 1·17205 } ' Dict. of Chemistry.	Mediterranean, off Marseilles.
Total solid residue . 13·42 Specific gravity . 1·102	Dr A. Marcet finds the total solid residue in 100 parts to be 24·580 (' Encyclopædia Britannica').	Total solid residue 4·079 Common salt ..... 3·471 ' Dictionary of Chem- istry,' Watts.

mud along the shore, so tame that they hardly noticed my presence, although I went close to them. The shore appeared perfectly flat on that side of the lake, but in the distance mountains rose in a greyish-pink haze. The sunset on that immense sheet of water was something beyond description, and the golden reflection from its calm surface surpassed anything of the kind I have ever seen.

To sum up my remarks on the climate of Cannes and, I may add, of the Riviera in general. In November and December the weather is usually stormy and wet. January and February are fine, with occasional visits of the dry north-west wind. During those two months the air is usually calm in the morning, with a pleasant, light southerly breeze blowing in the afternoon, while a northerly land breeze commences at sunset and is continued during part of the night. March and April are windy and showery, the winds showing no particular regularity, although, in general, easterly with wet weather.

In December and January the nights are comparatively cold. The grass may be seen covered with hoar-frost in early morning, and a thin sheet of ice may form on the road puddles, but wherever the sun reaches, except under very exceptional circumstances, it is melted by noon. In certain places with a northerly aspect, and screened from the sun, ice may remain all day, and even acquire a quarter of an inch in thickness in the coldest seasons. I have often observed the mud frozen and ice on the roads some

little distance, say a quarter of a mile, from the sea ; while the road was quite soft and there was no ice at all at the immediate seaside.

There are occasional hail storms, and snow may be expected about once every other year, disappearing, however, in the daytime within a few hours. It is not uncommon to see snow on the hills at the back of Cannes, although seldom reaching so low down as the town of "Grasse," 1000 feet above the sea, where the olive trees thrive, and a lofty palm may be seen growing amongst the houses.

Notwithstanding the showery and windy character of March and April, there is a freshness in the air at that time of the season most pleasant to invalids. April begins to feel warm after the 15th, and the temperature continues rising in May, although the breeze and occasional showers assist in cooling the weather. Many of the English colony at Cannes, who live there in their own houses, speak highly of the month of May.

There is one point connected with the influence of the meteorological phenomena of Cannes bearing upon health to which I have given special attention, that is, the sudden accession of cold, together with the increase of atmospheric moisture at sunset and continued at night. A great deal is said of the importance for invalids of being indoors before sunset, but, beyond a very vague knowledge acquired mostly by the sensation experienced at the time, very little was actually known of the exact degree of the fall of temperature

at that hour. It therefore occurred to me that by hanging up a thermometer to a string carried horizontally three feet above my lawn, thereby freely exposed to the air, and reading it every quarter of an hour, beginning just before sunset or as the sun was setting, I might obtain some positive knowledge of the fall of temperature after sunset. I chose, of course, as much as possible clear nights for these observations. A second thermometer placed under a screen yielded every quarter of an hour the temperature of the atmosphere independent of radiation, while the readings of a wet-bulb thermometer were also recorded for relative humidity. The results obtained are given at the end of this volume under the form of curved lines or charts, extracted from the 'Quarterly Journal of the Meteorological Society' for 1877.

On inspecting these records it will be observed that on the 18th of February, for example, the thermometer fell by  $2.5^{\circ}$  during twelve minutes, commencing at sunset (inclusively), and by  $7^{\circ}$  from sunset at 5.20 p.m., to 8.15 p.m., or in the course of two hours and fifty-five minutes. On the 23rd February, a quarter of an hour after sunset, the temperature had fallen by  $1^{\circ}$ , and an hour later there had been a further accession of cold by  $4.5^{\circ}$ . It will be noticed on the charts giving the results of these observations that an increase of relative humidity of the atmosphere followed, within certain limits, the fall of temperature after sunset.

In conclusion, I must beg to draw the reader's

attention to a circumstance which should never be forgotten in the appreciation of temperatures observed at night from thermometers kept under a screen, and thereby sheltered from radiation. This temperature is not exactly the same as that a person in the open air would feel at that moment on a clear night, being a little higher.

The cold experienced at sunset and immediately afterwards on a fine evening is owing in a great measure to the body parting with its heat by "radiation," while the thermometer under a screen is not subject to loss of temperature from this cause. On a cloudy or overcast night, the difference, if any, will be very slight, as the clouds interfere with this process of cooling. I have made an attempt to ascertain the extent of the difference of temperature to which I am alluding, by recording the readings of two minima thermometers, one of them sheltered from radiation under a louvred screen and the other freely exposed to the air three feet above ground; these observations were carried on daily during the months of December, January, February, March, and April, 1880. The mean minimum temperature for the five months under the screen was  $39.7^{\circ}$ , and that registered by the thermometer exposed to the air without any shelter was  $37.8^{\circ}$ , giving a difference of say  $2^{\circ}$ . Therefore, a person out of doors at the coldest period of the night at Cannes, will feel the air about  $2^{\circ}$  below the corresponding temperature as recorded in the ordinary meteorological tables, and somewhat lower



on very clear nights. Although the account I have given of the climate at Cannes applies in a general way, as previously stated, to that of the other health resorts of the French and Italian Riviera; there is, however, some little difference between each of them on which special claims to favour may be founded; this will be noticed in the following chapter.

## CHAPTER VI

HYÈRES, NICE, MENTONE, SAN REMO, BORDIGHIERA, PEGLI  
AND SPÉZZIA, AND THEIR WINTER CLIMATE

### HYÈRES

HYÈRES, lat.  $43^{\circ} 8'$ , long.  $6^{\circ} 8' E.$ , a town of 12,000 inhabitants, within a short distance from Toulon, is the first health resort on the Mediterranean coast after leaving Marseilles. Some people hold that station in great repute, especially because it is situated at three miles from the sea, while all the other health resorts of the French and Italian Riviera are at the immediate seaside. Hyères may be considered, moreover, a little height above the sea, as it is built around the base and on the south-eastern flank of a conical hill about 700 feet high, known as the Château Hill. I recollect ascending this hill some years ago in company with Dr Griffith, who has resided at Hyères for over twenty years, and it affords a very interesting walk. The top is covered with the remains of an old castle of the tenth or eleventh century, and a fine and interesting view is to be enjoyed from that spot. A spur of the Château Hill runs in a north-westerly direction for two miles to its highest point at the "mont Fenouillet" (900 feet).

From its position Hyères may be considered as possessed of an air more bracing and less irritating in its

character than that of the other Mediterranean stations. It may be said, moreover, that the sea breeze which blows along the Mediterranean coast from 10 a.m. till 3 or 4 p.m. is scarcely at all felt so far inland.

The drawback of that health resort is the "mistral," which, from the observations of Dr Bataille for the years 1816—25, blows upwards of sixty days in winter, spring and autumn. It is remarked by Dr Sparks that according to Dr de Valcourt\* the mistral is somewhat frequent in winter, although assuming much force in the spring only, and Dr Sparks confirms this statement with reference to the mistral at Hyères in the spring.

Professor Sigmund, of Vienna,† remarks that the main character of the climate of Hyères is its great variability. Dr Sparks quotes the following passage from this author :

"At any rate, all observers agree that it (the mistral) blows with the greatest severity for the longest periods and most frequently in the months of February and March, and it is the unanimous opinion of all visitors who are acquainted with the different health resorts of the Riviera that it occurs at Hyères with greater violence and penetrating powers than at any of the others."

Dr Henry Bennet states with reference to Hyères, "that it is thirty miles (half a degree) more south than Cannes or Mentone;" and he remarks that the

\* 'Climatologie des Stations hivernales du midi de la France,' 1865.

† 'Sudliche Climatische Curorte.'

north-west wind often blows there with violence in autumn and spring.

Dr Madden\* appears to hold Hyères in very great estimation as a health resort. He considers the place thoroughly protected from the mistral, and certainly does not agree in this respect with the other authors I have quoted.

From the above, and from whatever information I have been able to gather on the climate of Hyères, I am disposed to conclude that the mistral is frequent in the spring and autumn, when it often blows hard, although but occasionally felt in winter, and, at that period, with a moderate degree of force only.

The temperature of the atmosphere appears much the same, or perhaps a trifle higher, than that of Cannes or Nice. According to Dr Sparks, the mean temperature in December, January, and February ranges between  $50^{\circ}$  and  $55^{\circ}$ , which I think rather too high an estimate. Dr de Valcourt only assigns  $46.4^{\circ}$  as its mean winter temperature, and Dr C. T. Williams†  $47.3^{\circ}$ . In the absence of careful observations agreeing better with each other, the mean temperature of the three winter months may be considered, I should conclude, as ranging between  $47^{\circ}$  and  $52^{\circ}$ , while that of Cannes for those same three months is included between  $46.3^{\circ}$  and  $48.8^{\circ}$ . This would give a slight excess of temperature for Hyères. Dr Griffith, with a long medical experience of Hyères, observes that the cases of con-

\* 'Health Resorts of Europe and Africa,' 1876.

† 'The Climate of the South of France.'

sumption which do best there are of an acute florid type with high fever, and also those showing a tendency to hæmorrhage.

For a fuller account of this station as a health resort I cannot do better than refer the reader to the excellent book on the 'Riviera' by the late and lamented Dr Sparks, of Mentone.

The number of rainy days and the amount of rainfall appear to be comparatively low at Hyères. Dr Sparks, quoting from Dr Bataille's observations, gives 37·3 wet days during the six winter months, which would be less than at Cannes (46·5) or even at Mentone (42·1), although rather higher than at San Remo (29·7). Old observations of Beauregard for 1824—49 assign an average rainfall of 482 millimètres, or nineteen inches to Hyères, from October to February inclusive.

For want of reliable records on this point I shall propose to compare the number of wet days and amount of rainfall at Toulon (a short distance from Hyères) for the season 1878—79, as stated by Dr Sparks from Government reports, with my corresponding records for that same season at Cannes, as follows :

1878-79.—Toulon.					1878-79.—Cannes.				
		Wet days.		Rainfall.			Wet days.		Rainfall.
November	.	16	...	7·04	...	14	...	7·15	
December	.	14	...	3·24	...	13	...	3·72	
January	.	7	...	2·64	...	12	...	4·20	
February	.	5	...	0·94	...	12	...	3·12	
March	.	3	...	1·65	...	9	...	7·55	
April	.	11	...	3·41	...	16	...	7·17	
		56		18·92		76		32·91	

Consequently, during the season 1878—79, from November to April inclusively, there were fewer rainy days at Toulon than at Cannes by nearly one third, while the amount of rainfall varied from nineteen inches at Toulon to thirty-three at Cannes. Toulon was therefore, that season, much drier than Cannes. It is questionable how far the number of wet days, and amount of rainfall at Toulon, correspond with those at Hyères;\* still the figures entered in the present table certainly appear to show that Hyères, in the immediate neighbourhood of Toulon, has a smaller rainfall and fewer rainy days than Cannes. The prevalence of the dry north-west wind at Hyères favours this conclusion.

## NICE

The town of Nice, of about 60,000 inhabitants, skirts a wide bay sheltered eastward by the “Mont Boron,” a hill about 400 feet high, which rises between the town and the picturesque Bay of Villefranche. A mountain with a conical summit, the Mont Pacanaglia, towers over that bay at an altitude of 1890 feet, affording additional shelter in the same direction, while a succession of hills, the Mont Gros and Mont Vinaigre, join the Mont Boron in a northerly direction, and screen the town from the north-easterly wind. Between this line of hills, running north and south, and a spur of Mont Chauve, somewhat more to the west, known as Cimiès, there extends a deep, flat valley, through which runs the

\* ‘The Climate of the South of France,’ by Dr C. T. Williams.



River Paillon, skirting the foot of the Cimiès Hill. This stream is, in general, a nearly dry watercourse, but after heavy rains it swells and rushes through the town towards the sea, a muddy mountain torrent. The Paillon is anything but an ornament to the town of Nice. In fine and dry weather it carries a very small stream of clear water towards the sea, round which washerwomen congregate under a bridge close to the beach. During heavy rains the clear water of the Mediterranean becomes polluted with the muddy stream far and wide, and it is a sight of no little interest to witness the contest between the foaming waters of the Paillon and the waves of the Mediterranean dashing on towards the coast before the impelling gale. As if in defiance of superior powers, the waters from the hills run fiercely and wildly to the attack, and the dash is such that the seas are driven up to an immense height; the mighty wave then seems to hesitate as to which side it will fall, but the gale wins the day. Now the water curls over with majestic and indescribable beauty, and like a waterfall comes down with a tremendous crash, while the spray drenches the hundreds of spectators on the beach. Such a sight is often beheld in autumn and spring, and is invariably an object of great attraction.

The Cimiès Hill and Mont Chauve shelter Nice from the north, but it is rather more open towards the north-west, where the low hills of St Philippe oppose a barely sufficient obstacle to the mistral. These low hills,

however, afford sites for a number of villas from which a beautiful view of the sea and coast may be enjoyed. I can hardly do justice to the Cimiès Hill as a resort for a wide class of invalids, and its hotels and villas afford available means in this respect. The hill, a spur of Mont Chauve, as already stated, reaches to a height of 300 feet; its air is pure and bracing, while from this spot the town of Nice, the bay, and surrounding mountains, form a panorama of exquisite beauty. During my residence at Nice I had frequent opportunities of recommending Cimiès to my patients, on account of the bracing character of its climate. This change of air frequently proved most beneficial; some cases apparently hopeless, recovering, or at all events beginning to mend within a remarkably short space of time. I recollect a lady staying in one of the hotels at Nice, and who was suffering from protracted and uncontrollable hæmorrhage from the lungs. I procured an omnibus, in which she was placed in the recumbent position, and driven up to an hotel at the top of the Cimiès Hill. After a very few days the hæmorrhage ceased, and about a fortnight later she was able to leave; it was then late in the season. I met this lady some weeks afterwards at Aix-les-Bains, and found her improved in health in a remarkable degree.

March and April are the favourite months at Cimiès, when its hotels and villas are in greatest request. There are numberless charming walks to be taken in the neighbourhood, and the fields abound with wild

flowers. A twenty minutes' drive from Nice will suffice to reach the summit of the hill, where there is an old church to visit, together with the ruins of a Roman amphitheatre and other interesting relics of the Roman empire. The high road is always kept in excellent condition, and after reaching the top, another road down hill, through a district called Brancolar, may be taken to return home.

A stay of three winter seasons at Nice has made me thoroughly acquainted with this health resort, which is undoubtedly well suited to a wide class of invalids. Most people, however, who select Nice as a winter residence do so on account of its social aspect, which is very different from that of Cannes. Great pains are taken by the municipality and residents to entertain distinguished visitors from all parts of the Continent. Hence, Americans, Russians, and Germans, besides the French, are largely represented in the Nice society. They frequent the clubs, attend the theatres, and give parties, while the "élite" of the society is also to be met at public balls. Horse racing has been introduced for some years past with great success, and the carnival, now an elaborate and wonderful show, affords much amusement. Nice has, indeed, become a town where people seek for enjoyment in every way.

If I should be asked to draw a comparison between Nice and Cannes with respect to climate, I should be inclined to call Nice perhaps a trifle colder in winter, especially if there is much snow on the mountains.

When driving about at night to visit patients, I thought the air felt rather more chilly, but of course this can be but a very rough appreciation.

Monsieur Teyssaire has preserved and published records of twenty years' meteorological observations at Nice taken from instruments placed outside his window on a fourth floor, and facing north north-east; they were thoroughly exposed to the air from the hills. His mean results for the twenty years are as follows. I append the means of my six winter seasons at Cannes for the sake of comparison :

	Mean temperature at Nice.				At Cannes.
November . . . .	53·8	.....			52·6
December . . . .	48·5	.....			46·3
January . . . .	47·1	.....			48·0
February . . . .	46·2	.....			48·8
March . . . .	51·8	.....			51·0
April . . . .	58·1	.....			55·5
	<hr/>				
	50·9				50·4
	Corrected for seaside				50·8

M. Teyssaire's observations give therefore 0·1° F. higher for the mean temperature of Nice, and the conclusion is that the results of his observations for the season at Nice are the same as mine for the season at Cannes; there are slight differences, however, when the mean readings for one of the months are compared with each other, and it is just worth remarking that his record for January is lower than that for December, whereas the means I have obtained are lower in December than in January.

The winds at Nice are much the same as those at Cannes. As previously remarked, the town is fairly well sheltered from the east, north-east, and north winds, but is more open on its west and north-west side. The mistral is as well known at Nice as it is at Cannes, and from the bay being quite open, the winds produce a greater sea disturbance off the coast than at Cannes. There is a harbour on the east side of Nice, which has but a narrow entrance, difficult and awkward to navigate; and while boating is one of the attractions at Cannes, it is practically an unknown amusement at Nice, although the Niceregattas are an object of great interest. Sailing yachts join in these contests from all parts along the coast, and their usual rig, consisting of a very high lateen sail and a jib, while extremely graceful, appears well adapted to fast sailing. The same rule holds good as at Cannes with reference to the dry and wet winds, the former being westerly and the latter easterly and southerly.

In conclusion, Nice is an extremely attractive place for those whose object in wintering in the south is the pursuit of that kind of enjoyment a beautiful climate cannot fail to give, coupled with the exciting bustle and pleasures of society. Nice is a large town, and of course, on that account, open to objections in point of view of hygiene, while the part of the town inhabited by the native population is really dreadful to the olfactory.

I was always struck with the difference between the air of the hills near Nice and that of the town itself.

Most towns have some sort of smell attached to them. London has that of smoke, and objects taken abroad from England usually emit a smell of morocco leather when unpacked. Paris is not entirely free from a slight smell of drains. Berlin, in winter, has in many quarters an odour of apples, probably from the barges loaded with apples moored alongside the canal, and to the quay of the River "Spree." Naples, on the Chiaia, leaves an unmistakable impression of an atmosphere tainted with vegetable and animal matter in putrefaction. Most towns in America and Canada have a smell recalling that of petroleum, while in Norway I have observed the smell of fish to be prevalent in nearly every town. At Algiers there is a peculiar faint and sickening odour, which cannot but strike anybody entering a native's dwelling, and even in the streets; and I have met with it in the towns of Mogador, Mazagran, and Caza Blanca on the Morocco coast, as well as in Algeria.

The peculiarity of Nice, in a general way, except in the old town, is an absence of odour, but it seems as if the sharp and bracing air of the country had become "flat," while here and there in the spring-time, especially near the "Jardin Public," the outlets of the drains become painfully obvious.

### MENTONE

Mentone is a town of about 7800 inhabitants, close to the Italian frontier. It was first brought into repute



many years ago for consumptive patients by Dr Henry Bennet, who writes as follows in his book on 'Winter and Spring on the Shores of the Mediterranean :'  
"When I first arrived, there were scarcely any strangers, but since I have drawn the attention of my fellow-practitioners to the value of this climate as a health resort in chest affections, the foreign population has yearly increased, and numbered last winter (1873—4) above sixteen hundred." Mentone is certainly at present the favourite station on the Riviera for consumptive patients, which is not difficult to account for, as it is well sheltered from the northerly winds, being encircled by a high range of hills which rises directly from the seaside ; and its climate is rather warmer than that of the other health resorts of the North Mediterranean coast. Dr Bennet observes that, notwithstanding the complete protection from the north, north-east, and north-west, the wind is often rather high near the shore, but, he adds, that however strong the northern winds may be, the mountain valleys, and the more internal hills are quite sheltered and protected. The sun sheds its hot rays on that coast, towards which they are, moreover, reflected by the sea, while the hills at the back, becoming heated in the daytime, assist materially in checking the fall of temperature at night. Hence it is that the latitude of Palermo, or five degrees further south, must be reached to find the same vegetation as at Mentone, where groves of lemon trees grow in the open air like apple trees in an English orchard (Bennet).

The reflection of the sun's rays from the surface of a sheet of water must exert a very marked influence on the temperature of the air. I was never so struck with this circumstance as one afternoon this winter, in Hyde Park. The sun was giving out its pale winter light through a hazy atmosphere, and the air was sharp and frosty, though not particularly cold; on reaching the north edge of the Serpentine I unexpectedly experienced a decided feeling of warmth I could not at first account for; but on looking at the water I observed it lighted up by the sun's rays, which were reflected to the spot where I stood, and there, of course, was the source of heat. My thoughts reverted at once to the corresponding phenomenon on the Mediterranean coast; not, indeed, from the pale and uncertain rays of a London sun in winter, but from a bright southern sun emitting its light and heat through a spotless blue sky.

But what renders Mentone so admirably adapted to the growth of plants known to thrive under warmer latitudes, is the absence of exceptionally cold nights. At Cannes and Nice, some nights in winter, although comparatively few, are sharp enough to destroy lemon trees, and it is just those few cold nights invalids escape at Mentone. Dr Bennet observes that every twenty or thirty years an exceptionally intense frost occurs at Mentone, and kills the lemon trees in all but really warm and sheltered positions. In the more severe winters with a northerly wind he has repeatedly known the thermometer to descend below  $0^{\circ}$  ( $32^{\circ}$ )

several nights consecutively near the seashore, and at the outlet of the torrent beds, especially in the western bay. This bay is less sheltered than the eastern bay, and is visited at times by cool draughts through the valley known as the "Turin Valley." From sixteen years' observations, Dr Bennet gives  $52^{\circ}$  as the mean temperature at Mentone for the six winter months. Dr Freeman, Dr Farina, Dr Andrews, and Dr Siordet have also made observations of temperature at Mentone, some of which are reported in Dr Sparks' book. Dr Andrews had his thermometer in a Stevenson (louvred) screen on land well removed from trees and buildings, about twenty feet above the sea level and 100 yards from the sea itself, or as near as possible under the same conditions as my own instruments were placed during five out of my six seasons at Cannes. The means of his observations from 1873 to 1878 were—

	Mentone. Dr Andrews' observations.	Cannes. My own observations.
	Mean temperature.	Mean temperature.
November . . . .	54·1	52·6
December . . . .	49·7	46·3
January . . . .	49·0	48·0
February . . . .	48·6	48·8
March . . . .	50·7	51·0
April . . . .	56·7	55·5
	<hr/> 51·5	<hr/> 50·4
	Corrected for seaside	50·8

giving a mean excess of  $0\cdot7^{\circ}$  for Mentone. If the mean lowest reading at night for every month at Mentone

(Freeman and Andrews' mean of eight winters), be compared with that of the corresponding month at Cannes, it will be interesting to observe that the greatest degree of cold in December, which amounts to  $36^{\circ}$  at Mentone registers at Cannes  $33^{\circ}$  (author's observations, mean of five winters at the seaside), being an excess of  $3^{\circ}$  for Mentone. This circumstance accounts most satisfactorily for the more southern character of the Mentone vegetation.

The mean number of rainy days, and amount of rainfall at Mentone observed by Freeman and Andrews during the six winter months, are recorded as follows (Sparks), to which I append the corresponding readings at Cannes for the sake of comparison, together with the relative humidity :

	Mentone.			Cannes.		
	Relative humidity. 2 & 3 years.	Rainy days. 8 years.	Rain-fall.	Relative humidity.	Rainy days.	Rain-fall.
November . . .	75 %	10.10	3.73	71.2 %	9.5	5.17
December . . .	72	7.25	3.47	72.7	8.8	4.51
January . . .	72	5.10	1.24	71.7	6.3	1.69
February . . .	70	5.66	1.45	75.0	5.3	1.46
March . . .	74	9.55	3.69	73.1	7.1	3.42
April . . .	74	9.33	3.29	74.3	8.6	4.05
Means . . .	72.8%	47.0	16.87 inches.	73.0	45.6	20.3 inches.

This table brings out very distinctly one of the main differences between Cannes and Mentone. Although the

atmospheric relative humidity is practically the same, there is a greater rainfall at Cannes by 3·4 inches, with a rather smaller number of rainy days—45·6 instead of 47. Therefore, not only does it rain more at Cannes, but rain falls more heavily at a time than at Mentone. The smaller amount of rainfall at Mentone is in no way surprising, as the cold, damp, north-easterly and easterly winds being felt less in that district than at Cannes, there is a diminished tendency to condensation of moisture. The relative humidity is the same at both places; it cannot, therefore, be said that the air at Mentone is drier than it is at Cannes, and has, on that account, a greater capacity for moisture accounting for the lesser degree of rainfall.

Should the immediate seaside at Mentone be thought too windy, too relaxing, or too exciting to the nervous system, there are hotels at a slight elevation above the sea, and some little distance from it, where excellent accommodation for the winter may be had. The cost of living at Mentone has of late years increased much as elsewhere. Dr Siordet states that prices have nearly doubled since he settled there in 1861 (Sparks).

As these pages are going through the press, Her Majesty the Queen is honoring Mentone with a visit; and it is satisfactory to be able to remark that the sanitary condition of that beautiful Mediterranean health resort is in every way satisfactory. Dr Bennet states that the health of the native population is

exceptionally good, and that, according to Dr Bottini, a gentleman who practised more than a quarter of a century in that district, the average duration of life at Mentone is 45 years, while a large proportion of the inhabitants attain to above seventy years of age.

### SAN REMO.

San Remo on the Italian Riviera is about sixteen miles east of Mentone, and its importance, as a health resort, has much increased within the last few years. It lies at the foot of an amphitheatre of hills, the highest of which Mont-Pignone, to the north north-east, has an altitude of very nearly 4000 feet. The hills are covered with vegetation, and the landscape from the seaside is particularly pleasing. Dr Bennet remarks:—"No one can form an idea of the exceeding beauty of the environs of San Remo who has not stayed there long enough to explore some of its valleys and mountains, and so beheld some of the most beautiful of its scenery. Neither without such exploration can any just opinion be formed as to the resources which San Remo offers to the visitor and invalid, or of the vastness and completeness of the mountain shelter which it affords."

San Remo itself is built at the southern end of a ridge running almost due north and south. The town ascends rapidly in the form of a triangle, at the apex of which is a church; but the houses are so closely



packed as to look anything but inviting as residences, although at a slight distance they afford a novel and picturesque view. The hotels and villas inhabited by winter visitors are built on the slope of the hill on the west side of the town, mostly amongst olive trees, and enjoy a beautiful view of the sea. San Remo is a quiet spot in which to live a rural existence in peaceful oblivion of the outside world. There is unfortunately no other walk along the sea but the high road, while the country inland is up and down hill, which is an objection with many invalids. The hotels and villas afford every comfort that can be wished for, and there is an excellent staff of English medical practitioners.

The climate of San Remo is very nearly the same as that of Mentone, and has therefore a right to claim a rather higher winter temperature than Cannes or Nice. Observations ranging over from ten to twelve years at the Government Observatory (Daubiny) give a mean temperature of  $51.3^{\circ}$  for this place, which is, as near as possible, the same as at Mentone.

*Mean temperature at San Remo.*

November	.	.	54.4°	February	.	.	48.9°
December	.	.	49.7	March	.	.	51.1
January	.	.	46.6	April	.	.	56.9
<hr/>							
Mean for the six winter months	.	.	.	.	.	.	51.3
Mean temperature at Mentone	.	.	.	.	.	.	51.5
Mean temperature at Cannes	.	.	.	.	.	.	50.8

The mean number of rainy days (Daubiny and Government observations), from observations carried

on during a period of nine and ten years, was as follows :

November	.	.	4·7	February	.	.	3·9
December	.	.	5·2	March	.	.	5·8
January	.	.	3·4	April	.	.	3·0
Mean number of rainy days for the six months							26·0

Dr Hassall, from records at the San Remo Observatory, reports a mean of 29·7 days on which rain falls from November till April inclusively. It may be recollected that there is a mean of 37 rainy days at Hyères, 45·6 at Cannes, and 47 at Mentone, so that rain may be considered as falling certainly somewhat less often at San Remo than at the other stations. According to Dr Hassall, the yearly amount of rainfall, from the Observatory records, equals 28·78 inches (mean of years 1866—77, omitting 1870). Of this about two thirds, or three quarters, would fall in the course of the six winter months, yielding an average rainfall not unlike that of Cannes. It may be concluded that rain although not so frequent at San Remo as it is at the other stations, falls rather more heavily at a time. The vegetation appears to be none the worse for this circumstance, as the nature of the soil is said to be such as to retain moisture longer than at Mentone.

*Winds.*—According to Dr Sparks, winds from the east and south-east are those which are mostly felt at San Remo, and Dr Hassall observes that the prevailing winds in winter are northerly; but he adds that, owing to the mountains round San Remo, these winds

blow over the district and strike the sea some distance from the shore. They are excessively dry, a circumstance calculated to account for the fact that rain falls at San Remo less often than on the more westerly health resorts of the Riviera. He remarks that the *mistral* is but little felt, usually coming upon San Remo after rounding Cape Nero, as a south-west wind, sometimes cold, bracing, and exhilarating, but at others disagreeable from its keenness and the dust to which it gives rise. According to Dr Sparks, the *mistral* is by no means unknown at San Remo, as must be concluded from the frequent mention of the north-west wind in the reports of the Government Observatory, especially during the months of December, January, and February. The south and south-west winds are often accompanied with rains, and there are occasional south-westerly and westerly gales. Dr Hassall remarks that rain with the north-west wind is rare, and when it does occur the cause is generally a European storm.

In conclusion, it may be said of San Remo that the dry northerly winds predominate in frequency, although but little felt on account of the hills; while the east and south-east are those which mostly visit the district, particularly in March and April; they bring from time to time heavy rains and storms, as usual on the Riviera. The north-west wind is an occasional visitor throughout the winter months, unpleasant from its dryness, but heralding fine weather.

Dr Hassall has communicated to the 'British Medical Journal' for 1880 a series of observations he has made on the climate of San Remo during the winter season 1879—80, the more trustworthy from the well-known scientific accuracy their author possesses. I was wintering at Cannes at the time, and it will not be without interest to compare the records of my observations with his own.

I had removed for that season from the seaside to a house built on the summit of a low hill (Boulevard du Cannet) eighty feet above the sea, and rather less than a mile from it; and it so happened that a friend who lived in an hotel close to that spot, had kept for me the year before, a careful record of thermometric readings, using my own instruments; these were sheltered from radiation under a screen placed about three feet high on the north side of a wall. Simultaneous observations were carried on by me at the seaside, and the two sets of readings were continued daily throughout December, January, February, and March; the results showed that the air was rather colder at the high station than at the seaside, the mean difference amounting to  $0.4^{\circ}$  at nine o'clock in the morning,  $1.2^{\circ}$  for the maximum reading, and  $3.4^{\circ}$  for the minimum reading. It will be necessary, therefore, in order to compare my observations at Cannes with those of Dr Hassall at San Remo, to correct my readings for the temperatures of that season, according to the data obtained in the preceding winter.

Dr Hassall's observations for temperature were made

at 9 a.m., 3 p.m., and 9 p.m.; he also noted daily the readings of a maximum and minimum thermometer. I propose to compare his observations at 9 a.m. and his maxima and minima readings with my own, as follows; both sets of thermometers appear reliable, being by excellent makers and tested for correctness.

	San Remo.		Cannes.		Increase of temp. for San Remo.
9 a.m. . .	51·1°	...	49·8°	...	1·3°
Maximum .	57·7	...	56·1	...	1·6
Minimum .	45·8	...	43·5	...	2·3
<hr/>					
Mean . .	51·7	...	49·8	...	1·9

These figures show a decidedly higher mean temperature at San Remo. The ten years' observations, of the Government Observatory, give a mean excess of 0·9° for San Remo over the mean temperature of Cannes, while those just quoted show a mean excess of 1·9° for the season 1879—80. The difference is rather high, probably because of the extreme cold in December, 1879, when the corrected difference between the minima readings gave an excess of no less than 4·1° for San Remo. It would therefore appear that the excess of temperature at San Remo is not so much owing to the high temperature in the daytime as to a lesser degree of cold at night.

The mean maximum daily temperature of the sun's rays for five months at the two stations were as follows:

		San Remo.		Cannes.
December	.	113·0°	...	86·8°
January	.	114·3	...	90·7
February	.	118·5	...	101·0
March	.	123·1	...	115·0
April	.	129·7	...	118·5
Mean	.	119·7		102·4

Giving an excess of 17·3° for San Remo. The month of December, which was everywhere particularly cold that year, showed a temperature of 26° higher for the sun's rays at San Remo. There can be no doubt, therefore, that San Remo is warmer than Cannes, and that must be owing to a drier state of the atmosphere, which, on that account, absorbs less of the direct heat of the sun's rays.

	Number of rainy days (1879-80).				Amount of rainfall (1879-80).			
	San Remo.		Cannes.		San Remo.		Cannes.	
November	.	6	...	9	...	2·40	...	3·19
December	.	3	...	3	...	1·65	...	0·67
January	.	1	...	3	...	0·08	...	0·37
February	.	5	...	5	...	2·70	...	2·66
March	.	3	...	2	...	0·20	...	0·13
April	.	9	...	11	...	3·30	...	3·42
Mean	.	27		33		10·33		10·42

This table shows that the mean amount of rainfall was as nearly as possible the same at the two stations, although the rainy days proved to be certainly fewer at San Remo.

Finally, the mean monthly temperature of the Mediterranean Sea, as recorded by Dr Hassall at San Remo and myself at Cannes, was as follows :



*Temperature of the Sea (surface) (1879-80).*

	San Remo.		Cannes.
November . . .	60·2°	...	61·2°
December . . .	53·8	...	55·8
January . . .	52·8	...	54·6
February . . .	53·8	...	55·4
March . . .	55·2	...	57·1
April . . .	57·4	...	59·5
Mean . . .	55·5	...	57·3

This would appear to show that the surface of the sea at Cannes was warmer by about 2° than at San Remo, a difference which may be accounted for from the bay at Cannes being much more sheltered from the open sea and westerly currents than San Remo. The “Lérin Islands” on the east side, and the promontory of the Esterel mountains, which extends far south on the west of Cannes, partly enclose the sea, giving it somewhat the aspect of a lake. At San Remo the coast is not screened from the open sea, and the Capo Nero can oppose but a very inadequate obstacle to the colder westerly currents.

## BORDIGHIERA

Is a small town of 2000 inhabitants on the Italian Riviera, and is situated between Mentone and San Remo, ten miles from the former and five from the latter. Like San Remo, this spot has for some years past been gaining in favour as a winter residence for

invalids. It consists of houses closely packed, and like other Italian towns of the Riviera, has narrow streets arched over at places. Between Bordighiera and Ventimiglia the Italian frontier town on the French side, olive woods abound, and the whole plain to the west north-west is a sea of olive trees. In the course of the streams there are many beds of bamboo, and on the level space between the hills and the sea numerous groves of lemon trees may be seen, sheltered to some extent by walls or screens made of bamboo or palm leaves. The vine is also extensively cultivated here, and there are a few umbrella pines as well as aloes (Hassall).

Bordighiera is best known for its groves of date-palm trees, met with everywhere in its neighbourhood. They are of all sizes and ages. Some of them attain a height of a hundred feet or even more, and are, it is stated, over a thousand years old. They form the main attraction of this place, and their leaves are profitably disposed of to supply the churches of Rome on Palm Sunday (Hassall).

There is an old and a new town. After descending among the olive trees from the old town in a south south-westerly direction, in less than ten minutes the eastern extremity of the straggling street which forms New Bordighiera is reached. It extends for a distance of about half a mile, from south-east to north-west, not far from the seashore. There are two hotels, one opposite the station, the "Hotel de Bordighiera," and the other on the south-western side, five minutes

further on—the “Hotel d’Angleterre.” To the north north-east and east, New Bordighiera is sheltered by unbroken hills, covered with olives and pines, their height varying between 400 and (at most) 1000 feet (Sparks).

Bordighiera, standing on a promontory which projects into the sea, should only be used as a winter station where benefit from sea air is expected.

With respect to the winds a gale from the south-west sometimes blows, but the prevalent bad wind is the east wind (Sparks). According to Dr Sparks’ experience, the district near the sea is at times liable to strong winds; shelter is obtained among the olives at the base of the hills, but it would be a mistake to think Bordighiera a very sheltered spot, especially in the spring.

The temperature of the atmosphere is apparently much the same as that of the neighbouring stations, Mentone and San Remo, as may be concluded by the nature of its vegetation. Dr Hassall, however, considers its winter climate somewhat colder than that of the two other towns, and less dry, especially the western part. He concludes by observing that invalids may find Bordighiera an extremely dull place for spending the winter.

*Pegli* and *Spezzia* can hardly claim our attention as important stations, although most of their winter visitors speak highly of them. Pegli is a town on the seashore about seven miles west of Genoa, and contains 4000 inhabitants mostly engaged in fishing and

shipbuilding. The hills at the back are covered with woods of the maritime and umbrella pines. They shelter the town from the north winds which blow over the hills, reaching the sea half a mile from the shore. As these northerly winds predominate, Pegli cannot be called a windy spot. It is less dry and not quite so warm as the other health resorts of the Riviera, and, according to the late Dr Maund, who practised two winters at Pegli, its climate may be considered as about half way between that of Mentone and Pisa both as to temperature and dryness. He remarks, that many patients who are uncomfortable in the extremely dry air of Mentone improve much at Pegli. This gentleman found Pegli well suited to cases of asthma, and he observes that many asthmatic patients resort to it from various parts of Europe (Sparks).

Spezzia, about fifty miles east of Genoa, is situated on the shore of a magnificent gulf, seven miles in depth, and contains 20,000 inhabitants. It is an important town on account of its arsenal and dockyard, in which the ironclads *Dandolo* and *Duilio* were built. On its north-west and west sides there is a high chain of mountains rising, at a little distance, to an elevation of 2109 feet, while nearer to the town the Monte Parodi can be ascended to the summit by a carriage road.

The winter climate of this place is mild, although the weather is often somewhat cold and a great deal of rain falls throughout the winter (Bennet). While sheltered on the north and west sides, the town and

gulf are quite open to the south and south-east. The east winds are said to bring fine weather, but the prevailing winds are southerly. The north-east, according to Dr Cruicknell, is only cold when there is snow on the Carrara mountains. This gentleman reports forty-seven sunny days, thirty-six rainy days, two days on which snow fell, and sixteen days of rough wind, including twelve attended with the sirocco or south south-east wind, during the months of December, 1878, and January and February, 1879. Dr Bennet states that there are marshes of considerable extent at the foot of the hills which surround the town, and that in the autumn malaria is rife.

In summer and autumn Spezzia is frequented by Italians as a bathing-place, for which it is well adapted from its sheltered position (Sparks).

## CHAPTER VII

ALGIERS, PAU, PISA, ROME, NAPLES, PALERMO. EGYPT

### ALGIERS

IN May, 1880, after the termination of the season at Cannes, I took a short trip across the Mediterranean to Algiers, in order to ascertain personally what resources this part of the African coast offers to invalids. It must be recollected that Algeria is a strip of land about 1200 miles from east to west, and comprised between the thirty-seventh and thirty-third degree of latitude, while extending about 200 miles from the Mediterranean coast to the desert where mountains disappear and the level is only a few feet above the ocean. The range of the Atlas mountains runs through this country more or less parallel with the Mediterranean. It is divided into three chains: the Lesser, the Middle, and the Great Atlas, the former skirting the Mediterranean coast at a distance of from one to fifteen miles, the Middle Atlas commencing 120 miles east of Algiers and extending into Morocco, while the Great Atlas skirts the desert forty or fifty miles south of the Middle Atlas. The intervening tract of land between the sea and the



Lesser Atlas is that on which Algiers is built. Between the Lesser and Middle Atlas there is a fertile alluvial valley, called the Valley of the Cheliff, through which flows the river bearing that name, the largest in North Africa after the Nile. The region extending from the Middle to the Great Atlas is occupied by elevated plains several thousand feet above the sea, and called the Algerian Desert. Salt-water lakes are met with in these plains, from the watersheds of the north and south slopes of the two chains respectively ; it is from these districts that arises the large Cheliff river (Bennet).

The latitude of Algiers ( $36^{\circ} 47'$ ) is considerably south of that of the Riviera, being  $6^{\circ}$  and  $46'$  south of Cannes, and nearly that of Syracuse in Sicily ( $37^{\circ} 5''$ ). While on the Riviera the north and north-west winds are dry and foretell fine weather, the north-west and west winds on the coast of Algeria, common in winter, are charged with moisture from the Mediterranean, and driving up the sides of the Lesser Atlas mountains, become the source of heavy rains or snow on their highest slopes ; indeed Dr Bennet remarks that snow remains in mid-winter down to a level of 1600 feet above the sea. Therefore, while on the Riviera the prevalent winds are deriving increased capacity for moisture as they travel on, those that prevail on the Algerian coast become damper, approaching more and more the point of saturation. Thus it was that after leaving beautiful warm summer weather at Cannes in May, 1881, on landing at Algiers with my party, we found colder weather, with a chilly rain falling

heavily day after day, which interfered very much with the pleasure we had anticipated from a short visit to Algeria.

I think it extremely difficult to form a correct idea of the climate of Algiers from its being so differently described by authors who have treated the subject; and on that account we cannot but conclude that it is very changeable.

The rainfall in Algiers, during the six months, November to April, is put down at 30·4 inches in Beardmore's 'Manual of Hydrology,' and Dr Bennet, quoting from Dr Armand,\* gives thirty-one inches for the rainfall of the six winter months (mean from 1839 to 1845). Most rain fell in December and January (eight inches in the former and six in the latter), and least in March. It has been stated that a mean of 20·3 inches of rain is recorded at Cannes during the six winter months; therefore the rainfall at Algiers exceeds that at Cannes by about one third. M. Gaskell† remarks that some of the French guide books call winter in Algiers "La saison pluvieuse," but then, he adds, "everything is relative, and Algiers can be called rainy only when the necessary and refreshing showers, which fall at intervals between September and April, make it wet *in comparison* with the summer months, during which it seldom rains, abundant dew supplying its place."

\* 'Médecine et Hygiène des pays chauds et spécialement de l'Algérie et des colonies.'

† 'Algeria as it is,' by George Gaskell. 1875.

When rain falls it often comes down in torrents of short duration; what is called a spell of bad weather being almost unknown. Mr Gaskell has noticed rain mostly at night; Dr Armand, however, states that in 1843 rain fell on 44 days and 34 nights. Mr Gaskell makes the remark, important for invalids, that the weather becomes cooler in the afternoon from 4 o'clock, and recommends dressing warmly after this hour. Eight months of the year, observes the author from whose book I am quoting, "from the beginning of October to the end of May, the weather is delightful, being neither too hot nor too cold. There is no necessity for fires, although every room has a fireplace. . . . The country is green, flowers bloom, birds sing, all nature rejoices in life and colour, whilst frost and snow being never seen, it is scarcely possible to believe that it is winter."

Compared with the climate of the Italian peninsula, Mr Gaskell considers that of Algiers more equal, the transitions from hot to cold in Italy being more sudden and severe, and while there is a winter in Italy with rain and cold weather, in Algiers, properly speaking, there is no winter at all. In his opinion, the seaside-temperature in winter in the shade, on the coldest days at sunrise, may be put down at  $48^{\circ}$ ; at noon, in the shade on those same days at  $60^{\circ}$ . At sunrise in fine weather the thermometer outside the house in the shade usually indicates  $55^{\circ}$ , and at noon  $67^{\circ}$ .

The above is an attractive and inviting account of the winter climate at Algiers, but Dr G. Daremberg,

in a paper read at the meeting of the International Medical Congress held at Geneva in 1877,\* describes it under quite a different aspect. It must be recollected, however, that this gentleman was only there one winter, and that it is hardly fair to form an opinion of a climate on such slender bases. Anybody, for instance, wintering in the Riviera throughout the season 1878—79, when there were 76 rainy days and only 100 fine days, might naturally enough feel tempted to write disparagingly of such a climate, although the very season before there were 132 fine days and only 29 rainy days. Dr Daremberg, arriving at Algiers at the end of October, 1875, found the heat too great to be pleasant, even at eight o'clock in the morning. About the end of the week he became exposed accidentally, after a beautiful day, to what he calls an icy wind, from which he suffered severely, being then in ill health. From this period he observes: "the variations of temperature increased in frequency, and the further the winter progressed the more I felt unpleasantly affected." He left at the end of March for Mentone, where, I believe, he has wintered ever since under conditions which have proved more favorable to his state of health.

Finally, the fall of temperature from radiation at sunset and at night is clearly, from Mr Gaskell's remarks, often felt at Algiers and in its neighbourhood, although, from the increased atmospheric humidity at that period of the day, it is probably less

\* "Comparaison des climats d'hiver sur les côtes Africaines et Françaises de la Méditerranée."

marked than on the Riviera. I regret I took no particular notice of the circumstance during the short time I spent in Algeria.

I would sum up as follows the climate of Algiers :— Temperature probably somewhat higher than on the Riviera, showing a mean for the six winter months of  $56\cdot6^{\circ}$ , from Dove's tables. Extremes of cold, especially at night, not so great. The mornings from 8 o'clock warmer than on the Riviera, and this must be trying to invalids, who cannot but benefit from the cool of the early hours. During the daytime occasional accessions of heat. Great and trying changes of temperature, frequent throughout the season, and weather occasionally cold and wet in March and April; a greater rainfall, and a damper state of the atmosphere than on the Riviera. The absence of mosquitoes at Algiers (Gaskell) is a circumstance to be noticed in its favour. It is difficult to say which are, as a rule, the finest months of the winter, as the rainfall appears distributed pretty equally through the six months; the maximum, however, is met with in December and the minimum in March, while November and January exhibit the greatest number of wet days. It should be stated that Dr Bennet concludes, from the plants and trees of Algiers, that the Algerian winter is as cold as that of the Riviera, the difference of latitude being made up by the position of the sun at noon in winter, which does not allow it to shine with the same power on the Algerian coast as on the north shore of the Mediterranean

The Atlas mountains in the south protect the coast from the southerly winds, while those which prevail—the west, north-west, and north-east, blow from the Mediterranean. The least frequent is the south or sirocco, which, though usually very hot, is felt as a cold wind when the mountains are covered with snow.

During the six summer months very little rain falls, the weather continues mostly very fine and hot, and there are heavy dews at sunset.

It can hardly be said that on landing at Algiers the same pleasant and cheerful sensation is experienced as on skirting the Mediterranean coast after leaving Marseilles. The shores have a monotonous look, while the town of Algiers, with its whitewashed houses huddled close together on rising ground, are not suggestive of a cordial greeting.

The hotels at Algiers we found unequal to those of most of the well-patronised European health resorts, but visitors usually take up their residence for the winter on a hill at the back of the town, known as Mustapha Supérieur. This is certainly a picturesque spot, but we drove round it in a pelting rain, and the next day we walked through the beautiful “Jardin d’acclimatation,” or botanical garden, on a cold day, rain coming down as if it would never cease.

With reference to Algiers in its medical aspect, it is enough for me to observe at present, that towards the cure of consumption, it will prove inefficient, although some cases may be temporarily benefited by its climate. I should be afraid that, from the accessions of heat and



cold, a tendency to pulmonary hæmorrhage in certain cases might be induced, which, of course, would do away entirely with every hope of benefit in such instances. But where health will allow travelling Algeria will prove very interesting to visit, and a portion of a winter can be most pleasantly devoted to that object.

## PAU

There is something in the air and climate of Pau (lat.  $43^{\circ} 17''$ , long.  $0^{\circ} 23'$ ) undoubtedly beneficial to certain classes of invalids, and this town has been in repute, as a health resort, for a considerable length of time. Thus, Sir A. Taylor, writing in 1842,\* remarks that, "for twenty years Pau has been progressively acquiring a quiet celebrity among an unbroken succession of visitors." It is not, however, the mildness of the winter which forms its chief attraction, as its winter temperature does not resemble that of southern stations, but is more like that of the central portion of the Continent. Neither can it compare with the Riviera for dryness of atmosphere, the number of rainy days and rainfall far exceeding those of the privileged stations of the Mediterranean coast. It rests its claim, however, as an important health resort on several conditions which it unites. First of all, its atmosphere may be considered as particularly pure and the town extremely healthy. We

\* 'The Curative Influence of the Climate of Pau.'

hear from Sir A. Taylor that the inhabitants are particularly free from illness, and singularly exempt from those epidemic diseases which have, at different periods, raged in Europe. There is not in Pau, this gentleman observes, any malady which deserves the rank of a predominant one. Pau is also free from endemic affections of all kinds, scrofulous and tuberculous diseases being found in a very small proportion to the population. Bronchitis is not unfrequent during the winter and spring, though not possessed of the acute character often met with in England. Sir A. Taylor insists on the peculiar longevity of the inhabitants of Pau, and remarks that in the winter previous to the publication of his book (3rd edition, 1861), there were in that town several persons ranging from one hundred to one hundred and four years of age, and in the Department several centenarians who are described as being still very healthy. I believe this satisfactory condition of the town of Pau to be owing in a great measure to thorough ventilation, but especially to its being free from a dense population crowded in small unhealthy houses, adjoining narrow, filthy streets. Such places, I regret to say, are met with even in those fashionable health resorts, Nice and Cannes. In localities of this description, the welcome rays of the sun seldom, if ever, penetrate, and the air feels suffocating, while the smell from refuse putrefying in the gutters may be quite sickening. It is hardly possible to conceive how life can be carried on under so complete a disregard of sanitary

laws, yet in these unhealthy dwellings a whole population is born, lives and dies. It is a very general opinion that filth and decomposing organic matters are a cause of typhoid fever, but this is not the case, and no fevers or infectious diseases can break out unless the poison peculiar to such affections be present. The poison or virus of typhoid fever is of such a nature that it becomes intensified in its action by the presence of putrefying matters, so that an extremely small amount of this substance, whatever be its nature, which, under good sanitary conditions would probably prove inert and therefore harmless, will give rise to a severe epidemic under circumstances favorable to its development. In accordance with these facts, a thorough system of drainage, while curtailing more or less the power of the typhoid fever poison of reproducing itself, will not, I fear, succeed in keeping it within harmless bounds in such places as the old town at Cannes and at Nice until their sanitary condition has undergone a complete change.

I do not believe that the virus of typhoid fever can be so accommodating as to spare the town of Pau occasional visits, but it remains innocuous, or at all events, does not appear to spread, because it finds no material to feed upon. The same remark applies to cholera, which Pau is reported to have escaped in 1832-33. During the epidemic of 1855, out of 17,000 souls there were not more than fifty fatal cases, and the disease was principally confined to the lunatic asylum, and its neighbourhood; out of 230

inmates of the asylum, of both sexes, thirty died (Taylor).

The altitude of Pau, though but 600 feet above the sea, promotes a pure state of the atmosphere, while it assists the function of respiration of its inhabitants, as will be explained on a future occasion.

The town extends from east to west and may be said to have three parallel streets. It is built upon a terrace which overlooks the River "Gave," at an elevation of 150 feet, and facing the Pyrenees. The season commences on the 1st of September and continues till the 1st of June; most visitors live in apartments, but they can take a house out of town if they like. I need not add that the pleasures of society, opportunities for out-of-door exercise, and the comforts that may be wished for, can be had at Pau.

There is no doubt but that considerably more rain falls at Pau than on the Riviera; it comes down in heavy showers but not long at a time, and the streets from their sloping position, quickly dry up. The number of rainy days in the year, according to Dr Lombard, is 125, while the amount of rainfall equals 42.72 inches. Rain, according to this author, is met with mainly in the spring and autumn, somewhat less in winter, and very seldom in summer.

Sir A. Taylor gives the average winter weather at Pau from eight years' observations by Dr Ottley, as follows, to which I have appended, for the sake of comparison, the corresponding means at Cannes,

from my own observations, and those recorded at Greenwich :

	Mean temperature.			Average number of days on which rain fell.			Amount of rainfall.		
	Pau.	Cannes.	Greenwich.	Pau.	Cannes.	Greenwich.	Pau.	Cannes.	Greenwich.
							Inches	Inches	Inches
November .	46·9°	52·6°	42·8°	10	10·5	13	3·34	5·17	2·23
December .	42·5	45·3	40·7	11	8·2	15	5·40	4·51	1·76
January .	40·5	48·0	38·9	12	5·7	17	3·38	1·69	2·12
February .	43·2	48·8	39·7	10	5·0	15	2·62	1·46	1·44
March .	47·9	51·0	41·5	11	6·5	17	4·0	3·42	1·47
April .	53·3	55·5	47·2	15	12·5	13	8·13	4·05	1·66
Means . .	45·7°	50·4°	41·8°	69	48·4	90	26·87	20·30	10·68
Corrected for seaside	50·8°								
*									

The winter climate of Pau is therefore intermediate between that of the Riviera and London; it is colder than that of Cannes by a mean of 5·1°, though warmer than that of London (Greenwich) by 3·9°. The number

\* Since the above has been in print Dr W. B. Oliphant has been so kind as to send me his last five years' meteorological observations at Pau, together with Dr Duboués' book on that same station. Dr Oliphant's observations, which I believe to be quite reliable, yield the following results for the six months of the winter season :

Mean temperature (mean max. and min.) . . .	47·40
Mean number of rainy days, exclusive of those on which 0·1 inch fell . . . . .	93
Mean amount of rainfall . . . . .	28·31

Dr Ottley's observations (Duboués) give a mean temperature of 46·9°, but his number of rainy days are only 73, and the amount of rainfall 22·76 inches, both of which are apparently too low. I append Dr Oliphant's figures at the end of the volume.

of days on which rain falls exceeds by nearly one half the corresponding days at Cannes, while according to Dr Oliphant it is not far from twice as great. The amount of rainfall is greater by about one third than that at Cannes, and by over twice that at Greenwich.

“The average amount of cloud,” Sir A. Taylor remarks, “is much less at Pau than in England; consequently there is a great deal more sunshine. In fine weather at Pau the sky is usually cloudless. Fogs and days without rain, but on which no sun can be seen, though common enough in England in winter, are rare at Pau; and the sun even in mid-winter is hot enough to make the shelter of an umbrella desirable. This sunshine gives great cheerfulness to a winter climate, but invalids require to be careful not to subject themselves too long to its influence and then move into a shady and comparatively cool spot.”

The mean relative humidity of Pau (observed at 9 a.m.) for the six winter months (November to April) amounts to 78·7 per cent. (Ottley, mean of fifteen years), which is higher than the corresponding figure for Cannes (73 per cent.), and lower than at Greenwich (90·7 per cent.). The atmosphere at Pau, however, dries up in April, when the relative humidity falls to 73 per cent. (Ottley).

The climate of Pau is similar in some respects to that of more northern latitudes, from occasional accessions of cold, which are sometimes considerable. The



number of nights in the winter during which the thermometer falls to the freezing point or below it, is on an average twenty-five. Frosty weather is, therefore, not uncommon during that season, and snow falls occasionally. Lombard observes: "On a mean of five years, twenty-two frosty days have been registered, and eleven on which snow fell. During the cold winters of 1837 and 1838 the thermometer fell to  $-8^{\circ}$  C. ( $17\cdot6^{\circ}$  Fahr.) and even to  $-10^{\circ}$  C. ( $14\cdot0^{\circ}$  Fahr.)."

A friend wintering at Pau during the season 1880-81, to whom I wrote for inquiry as to her impression of the weather at that place, answered me on the 27th January, 1881, reporting very cold and bad weather, no sun, rain falling incessantly and an icy-cold fog. Snow fell uninterruptedly two days and two nights, and several inches collected on the ground. This lady gives a gloomy picture of the weather as experienced at the time, but it must be recollected that December, 1880, and January, 1881, were exceedingly cold everywhere, especially December; and her account probably refers to the very worst weather which can be had at Pau. During the whole of my winter residence on the Riviera, this season was much the coldest, while in England the frost was particularly sharp and persistent.

Pau, situated at about twenty miles only from the nearest part of the Pyrenees, is on the north of the mountains; a circumstance which somewhat tempers, on one side, the violence of the cold northerly winds,

and on the other checks the oppressive and enervating influence of the south wind or sirocco, as it passes over peaks covered with snow (Taylor). According to Lombard, winds from the north-west, and from the north and west, prevail over those from the south, the east, and the north-east; the north-west winds bring cold and dry weather, but the westerly winds are always loaded with vapour from the ocean. Sir A. Taylor, however, observes that from the geographical position of Pau the north-west wind passes usually at a distance of seventy or eighty leagues from it. He also remarks that the east winds are scarcely felt there.

Winds, however, it is generally admitted, are comparatively few at that station, and the usual stillness of the air is one of the great attractions of this health resort. Bad weather sets in with the south and south-west winds, from which some shelter is obtained by a wooded park and an amphitheatre of hills.

The advantages of the climate of Pau over that of England may be summed up as follows:—Less cold, more sun, a drier atmosphere (though more rain), much less wind, and a peculiar character of the atmosphere, sedative or quieting to the nervous system.

According to Dr Taylor, the primary effects of the climate are to diminish nervous energy and arterial action, and induce venous congestion; hence in all diseases of an atonic character—in a depressed and relaxed state of the nervous and muscular systems,

and in congestive diseases, the climate of Pau is injurious. The mildness of the spring and the scarcity of winds, render it favorable in diseases of the larynx, trachea and bronchi. Dr Playfair has found it beneficial in dyspepsia, and in some cases of asthma (Clark).

The influence of the climate of Pau was clearly established in the case of two ladies living together, who had been under my care at Cannes, and subsequently spent a winter at Pau. Both enjoyed a tolerably good state of health. One of them, possessed a quick, sanguine temperament, suffered occasionally from acute rheumatic pains, and was greatly predisposed to sore throat; the other had a much more quiet disposition, and was subject to severe attacks of neuralgia. At my request the lady I have first alluded to, very kindly favored me with a few notes as to the influence Pau had upon her and her friend, adding a few remarks, which I think likely to interest the reader. She writes: "The climate of Pau suits me but not Mrs —, the sedative calm air that I found so tranquilising to the nerves, she found oppressive, and often, as she said, she quite longed to get up to the top of the highest hill to breathe. From the formation of this place (a sort of pie-dish form) it is sheltered from winds, and with the exception of an occasional storm of wind, perhaps once or twice in the season, you might go out with a lighted candle, and there would not be wind enough to blow it out. There is a

a good deal of rain, but the damp is, as they say, 'uncommunicative.' . . . It does not hurt my throat to go out there in wet weather, as it does elsewhere. . . . The climate is entirely different from that of the Riviera, and far less irritating in the spring to invalids, but the healthy have to go to Biarritz to be freshened up as they find it too relaxing. Pau is a large, old-fashioned town, with good wide streets, but the houses are so high that except in the middle of the day they are in the shade; and unfortunately one has to go through these streets to the two parks and the 'Place Royale,' where the band plays two or three times a week. These parks and the 'Place' are warm and sunny, and command a most beautiful view of the Pyrenees. . . . The town is well drained, and one is spared the awful odours that are so offensive all along the Riviera. There is no part older than another; there are narrower streets, but in the poorest corners the people are more cleanly in their habits than at Nice or Cannes. There is no old quarter that you shrink from entering, where the picturesque is made hideous by filth and degraded humanity. This may be accounted for by the difference of race that is so striking upon arrival from the south. The people are of a better type—are honest, good looking, and of a well-to-do race. There is no special English quarter, people take lodgings in the sunniest parts of the best streets or take villas in the suburbs. The walks and drives are flat and uninteresting, except upon the

“coteaux,” that are more distant but most beautiful in the spring.”

## PISA

Pisa (lat.  $43^{\circ} 48'$  N.), a town of 22,000 inhabitants, is situated nearly exactly in the same latitude as Nice, Florence, and Pau, yet its climate differs considerably from any other of these health resorts. Looking up towards the Gulf of Genoa on the map, Nice will be observed on the west, and Pisa on the east, so that the westerly winds reaching Nice and the Riviera overland, and attended with fine dry weather, visit Pisa after crossing a considerable tract of warm sea ; the prevailing winds at Pisa are those from the south and south-west, or from the sea, which accounts for the usual state of humidity of its atmosphere. When a survey of the surrounding country is taken from the top of the leaning tower, which every visitor to Pisa is sure to do, a flat plain of five or six miles, bathed by the River Arno, will be seen extending towards the sea ; while northwards a range of hills is observed, sheltering the town, in some measure, from the northerly winds. In the east the lower Tuscan hills check to a considerable extent the wind blowing from that quarter. The River Arno, as it makes its way through Pisa, takes a bend towards the north ; the northern side of the river, or Lung Arno, facing the south is, therefore, not only fully

exposed to the hot sun, but also to the sun's rays reflected from the river, while the houses at the back protect the locality from northerly winds. Invalids who intend wintering at Pisa invariably reside somewhere on this side of the river, where the best hotels and apartments are to be found.

Pisa, in winter, is not so warm as Nice. According to Dr Lombard, who has a personal knowledge of the place, having spent a winter there for the benefit of his health, the mean temperature in winter is  $7\cdot8^{\circ}$  C. ( $46^{\circ}$  Fahr.), in the spring  $14\cdot8^{\circ}$  C. ( $58\cdot6^{\circ}$  F.), summer  $23\cdot2^{\circ}$  C. ( $73\cdot8^{\circ}$  F.), and autumn  $17\cdot3^{\circ}$  C. ( $63\cdot1^{\circ}$  F.). Hence the winter is rather cool, being but  $5\cdot2^{\circ}$  higher than at Greenwich; but the spring ( $8^{\circ}$  warmer than in London, Sir J. Clark), and especially the autumn, are warm. Rain is abundant and falls heavily, though not long at a time; the mean annual rainfall is distributed as follows: in winter 10 inches, in the spring 9, in summer  $6\cdot89$ , and in autumn  $18\cdot6$ .

The sky is more often cloudy at Pisa than in the south of France, and the atmosphere is sometimes oppressive and frequently very damp. Lombard speaks in high terms of that town, and compares it to a green-house, free from sudden atmospheric changes. Its air is peculiarly soothing, and Pisa is a good place for a quiet invalid's existence. Lombard himself experienced there great relief from bronchial irritation, feeling, he remarks, as if oil was used to ease friction within the body and quiet



every kind of excitement. He objects, however, to that health-resort when a liability exists to pulmonary congestion and hæmorrhage, and adds that people with a lymphatic, bilious, or melancholic temperament would be likely to experience at Pisa an increase rather than a relief of their symptoms.

My experience of Pisa confirms the above remarks. A lady who for years had been suffering from a painful affection of the nervous system, attended with great nervous irritability and inability to sleep at night, after spending several winters at Cannes found Pisa to suit her very much better, inasmuch as she felt more comfortable, less excited, could sleep better, and was altogether in a more satisfactory state of health and more cheerful disposition.

It will be advisable not to go to Pisa too early in the autumn on account of the autumnal rains; the end of November is soon enough. The heat becomes oppressive in April, when a move is often made to Leghorn or to Lucca, at the foot of the Apennines, which is a pleasant and bracing resort. Lucca is also a convenient spot for patients who, after wintering at Pisa, are not well enough to travel north in the spring or early in summer.

As far as the climate of Pisa is concerned for the welfare of consumptive patients, I could not conscientiously recommend it, mainly on account of the dampness of the atmosphere; the oppressive sensation experienced there at times is also in direct opposition to the kind of climate such invalids require. I

believe, however, that in cases of acute bronchial irritation attended with a state of excitement of the nervous system, and inability to sleep, Pisa may be of great use.

## ROME

Rome (lat.  $44^{\circ} 55'$  N., long.  $12^{\circ} 27'$  E.) situated about fifteen miles from the sea, is built on seven hills, attaining an altitude of nearly 200 feet above the sea at the Capitol, and 162 feet at the Collegium Romanum. The muddy River Tiber flows through the town, occasionally flooding its banks in the spring and autumn, and proving on such occasions a serious cause of ill-health. I am informed by Dr. Aitken that its population from the census taken on the last day of the year 1881 was found to be 300,500 in round numbers, excluding the military. It is, however, underrated, as many inhabitants would not send returns believing that the census papers were for the purpose of new taxation. The Roman winter is often cold, and at all events very changeable in its character. I recollect some years ago paying Rome a short visit from Nice in the month of October; the weather on the Riviera was at the time beautiful and warm, and being under the impression that I should find a similar temperature at Rome, I neglected to take with me a sufficient supply of warm clothing. My anticipations, however, were doomed to disappoint-

ment, and I was welcomed in the eternal city by an extremely sharp and unpleasant wind, recalling the cold north-easterly blasts of old England in March and April.

I naturally took advantage of the opportunity to see whatever I could, in a couple of days, which was all the time I had to dispose of, but such inclement weather left me anything but a pleasant recollection. On my return to Nice I found that the fine warm weather I had left behind had continued uninterrupted during my absence. Dr Lombard is of opinion that the three spring months are the only ones during which invalids may expect to benefit from the Roman climate, to which, however, may be added, he observes, October and part of November.

Sir James Clark ascribes to the Roman winter season a mean temperature of  $10^{\circ}$  higher than in London, while according to Dove's meteorological tables, its mean winter temperature ( $46.7^{\circ}$ ) would only exceed that of Greenwich by  $6.9^{\circ}$ . Compared with the winter temperature at Pisa, that of Rome is nearly precisely the same, while the corresponding three months at Cannes, with a mean temperature of  $48.1^{\circ}$ , are somewhat warmer. The mean temperature in such a case as this one gives, however, but a very imperfect idea of the heat and cold felt at the different periods of the twenty-four hours, as the maxima are high and the minima may be comparatively low. Indeed, Rome is occasionally cold during the winter. The atmosphere is frequently damp, and fogs may

arise in the course of the Tiber both in and out of town. The atmospheric humidity varies in accordance with the winds, the wind from the north, or "tramontana," is cold and dry, while that from the south is warm and moist. The hot sirocco from the southwest, charged with humidity, is known for the feeling of oppression and languor it produces.

According to Lombard, rain falls heavily in December alternating with a keen sensation of cold from northerly winds. January and February are in general cold and dry. Spring is usually an early season, and March and April are very pleasant, although not free from a few wet days. The warm weather begins in May, setting in with heavy rains alternating with fine weather. The temperature commences to feel cool in September and October, at that time the vegetation, dried up by the summer heat, breaks out afresh under the influence of the autumnal rain and sunny weather, and to the Romans this is the favourite month. November is colder, and in December commences the changeable winter season.

The summer heat at Rome and the wet showery weather in November, with intermissions of bright sunshine, somewhat recall the climate of the Riviera at those periods of the year. The autumn rain, however, is colder, and the wind keener and more disagreeable than on the Riviera, while the sun from the latitude of Rome south of the Riviera by rather over  $1^{\circ}$ , will feel at least as warm when shining in a clear sky. Hence, people are liable to sudden changes of tempe-

rature greater than on the Riviera. The atmosphere, moreover, is rather damper at Rome, and the daily range of temperature in winter is greater than in the sunny resorts between Hyères and Genoa.

The winter in Rome will be found very pleasant when the sky is clear and the sun shining. Those who appreciate fine weather, and can patiently tide over occasional wet, or cold and windy days, making themselves comfortably warm indoors, will enjoy the Roman climate and speak highly of it. I am afraid, however, most invalids who select Rome as a winter resort, expecting to find there a bright genial and pleasant climate, will run great risk of being disappointed. Like at Pau the spring months, March and April, are the most pleasant, and it is then that the great affluence of visitors takes place to the ancient capital of the world. The sun's heat, however, commences to be very telling even at this early period of the year, and patients liable to hæmorrhage should be particularly careful, and consider whether they had not better leave for a cooler climate without any further delay.

Dr James Pollock,\* writing from personal experience on the climate of Southern Italy, concludes, with reference to phthisis, that these health resorts are available, either at the very outset of the disease, or when the affection has attained the chronic form of its advanced stage, provided that health should remain fairly good, associated with a certain amount of

\* 'London Medical Gazette,' 1851.

physical strength. He recommends those stations for the treatment of chronic bronchitis, and observes that neuralgia of a rheumatic character is often cured in the South of Italy; he has found, however, its distinctly intermittent form to be aggravated by a residence in the Roman plain. Dr Pollock agrees with Sir James Clark that strumous children generally derive great benefit from spending two or three winters in succession at Rome, but does not advise a longer stay as being too debilitating.

Sir James Clark had formed a very high opinion of Rome as a health resort. He observes:—"From these comparisons it would appear that the climate at Rome in regard to its physical qualities is one of the best in Italy for pulmonary invalids."

The sanitary condition of Rome, especially with reference to malaria or ague, and typhoid fever, is a subject of paramount importance for those who propose spending there the winter, or even but a short time, and whether they be invalids or in good health. The poison of ague in the marshy districts of the Roman Campagna is active throughout the whole summer, but does not appear to rise to any height above the soil, so much so, that in the neighbourhood of the Roman marshes, villages are seen perched on the intervening hills, the Italians having been taught by experience that such elevated spots offer comparative security against the effects of malaria.

Dr Aitken, of Rome, has been so kind as to send me two very interesting papers—one on the sanitary state



of that town, dated 1881, and the other on its malarial fever, dated 1878, from which I obtain the following information:—In the former publication, under the heading “How the climate affects English and American residents and visitors,” he observes:—“In former days strangers came to the city for the winter and settled down quietly, mostly in private apartments and in ‘pensions,’ or in the sunnier rooms of the hotels. They took life easily, saw the sights and visited the galleries in a leisurely way, were present at the church ceremonies, walked, rode, and drove a good deal on the Campagna, and entered moderately into the social life of the place; in short, lived healthier lives. Now the belief in the danger of residence in Rome is so firmly fixed, that the visitor thinks the best thing to do is to get out of it again as soon as possible. They live massed together mostly in crowded hotels, are out from morning to evening, working at sight-seeing harder than they ever do at their professions or businesses at home, eat largely at ‘tables d’hôte,’ sit for hours in asphyxiating reading rooms and salons, often engaged in discussing the dangers of the climate, or rush off to opera or theatre, or ball, or reception, thus thoroughly exhausting their nervous system, undermining their strength, and predisposing themselves to illnesses of every kind. Such a life, and the picture is not overdrawn, is necessarily more dangerous to the unacclimatised strangers in Rome than elsewhere, and, proportionately, there is no doubt that attacks of illness are much more numerous among such imprudent

visitors than they are among residents of the same nationality who understand the climate, and adapt their lives to the requirements which the Romans themselves advise, and observe. It need scarcely be said that the manner in which the English and Americans work at sight-seeing excites the most genuine amazement in the Italians, and confirms them in the belief that the members of those two nations are, as a rule, more or less eccentric."

Dr Aitken next proceeds to consider the definite meaning of the term "Roman fever," which produces such an impression on the imagination of travellers. The residents themselves are often puzzled to know what the illness is, as strangers include under that name all kinds of ailments, from a simple cold to a severe enteric (typhoid) fever. The truth is, he remarks, there is no such complaint. One form of malarial fever, adds Dr Aitken, does take a somewhat continued course, that is, it does not assume the intermittent or remittent type; but similar forms of illness have been described as occurring in other parts of Italy, in the United States, and in India, and exclude any idea of its being confined to Rome or its vicinity. In an article on this subject, published in the 'British Medical Journal' in 1878, Dr Aitken observes:—"I prefer to regard these fevers as malarial in their origin, though they presented a remarkably continued course, and it was very difficult to discriminate between them and mild enteric fevers." He alludes to this affection as typho-malarial fever.

In the pamphlet he published in 1878, Dr Aitken proceeds to describe the kind of fever he refers to as prevalent amongst the visitors, and originating with malarial poisoning, the predisposing causes being in the cases he has seen—unacclimatisation, lowered vitality from anxiety of mind, chronic or acute diseases, and especially those of a malarial character. The exciting cause in every case he has known, has been a direct chill when the body was overheated, or exposure during the night, or any circumstance diminishing the power of the body of resisting cold. He quotes many cases, amongst which it will be sufficient to recall one or two.

A young lady, aged 22, goes to an evening party after a fatiguing day's sight-seeing, dances until well on in the morning, stands, when perspiring, at the door awaiting her carriage, gets a chill, and the next day is laid up. A gentleman, aged 28, after a hard day's work with the hounds on the Campagna, arrives overheated at one of the gates after sunset, dismounts there, and drives to his hotel in an open cab without putting on a great coat. Two days afterwards he shivers, and he has a somewhat prolonged fever.

The disease is not dangerous, as none of the forty-five patients treated by Dr Aitken up to 1878 had died, while only three were dangerously ill. As to the treatment, sulphate of quinine gave the most satisfactory results, when compared with the effects of other medicines.

Typhoid fever is said to be always more or less prevalent in Rome ; but this certainly does not appear to be the case, and, Dr Aitken concludes, from his figures, that with the exception of London "it is certain that no capital of a large European state has a smaller death rate from enteric fever than Rome."

Lombard considers the bad sanitary state of Rome as owing to the cloaca under the ruins of Ancient Rome, in addition to the miasmata from the open country. Dr Aitken ascribes it to deficient drainage. Many of the old sewers, he observes, are in a most dilapidated state, and much time and money are required to rebuild them. The main defect, however, is the want of means for carrying the sewage out of Rome ; at present (1881) the sewers in the lower part of the city discharge directly into the Tiber, and are dammed back by every flood when the sewage finds its way into the subsoil, cellars, and underground areas, where its presence is most noxious. The ventilation of the sewers is effected into the streets, and sometimes by rain-water pipes. The house drains are badly built, untrapped and unventilated, except by open man-holes or rain-water pipes or soil-pipes. And to this may be added, that the modern sanitary appliances for preventing the contamination by sewer emanations of the air breathed in Roman dwellings, are no better than they were some fifteen or twenty years ago.

The water supply is said by Dr Aitken to be extremely satisfactory. It amounts to nearly 300

gallons daily for each inhabitant, and does not come from contaminated rivers or lakes.

One of the advantages of Rome are the facilities it offers for exercise in the country, and there are public walks in the part of the town chiefly occupied by strangers. The Piazza di Spagna, and vicinity, afford the best sites for a residence, while the streets running easterly or westerly are usually preferred, because more sunny and less exposed to the winds.

Sir James Clark recommends that invalids should arrive at Rome in October, and if the chest be affected, and the invalid very sensitive to the spring winds, the beginning or even middle of May would be sufficiently early for him to leave it. From my experience of the climate of the South, I should be inclined to recommend Rome to invalids in March and April only; although for people in good health there can be no objection to their spending the whole winter there. Certain precautions, however, will be important to observe, as chills are so easily taken from exposure to night air, or from the sudden changes of temperature, or from want of attention to clothing whilst visiting the different places of interest, where it is impossible to avoid being in and out of the sun.

Some people are subject at Rome to violent and distressing attacks of headache, or become liable to constipation or diarrhoea. It is important never to leave any of these ailments unchecked, and to have recourse to medical advice without delay.

The malaria arising from the Roman Campagna does

not appear to be entirely absent from Rome during the winter, although it greatly prevails in summer and autumn. Attempts, however, have been in progress for some time to improve the sanitary condition of the Pontine Marshes by means of plantations of trees, amongst these the eucalyptus, from its fragrant aroma, of an antiseptic character, has been selected as especially adapted to the object in view.

Sir Thomas Watson\* observes, in his admirable Lectures on the 'Principles and Practice of Physic,' that a remarkable property of marsh poison is its attraction and its adherence to the foliage of tall shady trees, and that it is dangerous to remain under large thick trees in places where malaria reigns. This statement I am able to confirm by personal experience; and I shall never forget, while on a hunting expedition in the forests of the State of Michigan, U.S., in the autumn of 1863, witnessing the terrific onslaught ague had made on every person, with but very few exceptions, living within or near these forests. At a small town on the railroad about midway between Port Huron and Grand-Haven, where I left the train, manual labour was all but at a standstill, everybody fit for work being stricken down with ague; and at a steam saw-mill within the forest, at a day's walk from the town, out of fifteen men employed on the premises, there were only two or three who were not yet laid up. The illness had spread so rapidly and with such vigour in this lonely spot, that provisions had been

\* 'Lectures on the Principles and Practice of Physic,' vol. i, p. 791.



all but allowed to run out, and nothing more than potatoes and a little bacon was left when I reached the place. I slept three nights in the house adjoining the mill, in the same room with several men suffering from ague, and thinking every moment that my turn would come; and then returned to the town. The next day, as I was walking along the woods on the slope of a hill within a short distance from the houses, I became conscious of a constriction of the stomach and a peculiar lightness in the head of a very suspicious nature; fortunately quinine was at hand at the "store," and after swallowing a large dose of this valuable febrifuge I took the first train for Grand-Haven, on Lake Michigan, and thus escaped the attack.

#### NAPLES (lat. $40^{\circ} 51'$ )

Is protected to some extent from the northerly winds by the hills which encircle the city. The prevailing winds are the south-west, often accompanied by severe gales and cloudy weather, and the south or sirocco, attended by an oppressive and depressing heat. The weather at Naples, as at Rome, is peculiarly changeable in its character, and the extremes of temperature in winter, throughout the twenty-four hours, are great. The climate, however, is dry and warm in winter, with a mean temperature of  $48^{\circ}$ ; in spring it rises to  $58^{\circ}$ , and to  $70^{\circ}$  in autumn. The annual rainfall amounts to 29 inches, of which the largest proportion occurs in autumn (Madden).

I do not think Naples is much used as a health resort. The inefficient state of the drainage, the smell along the Chiaia, and the noisy habits of the inhabitants, being sufficient to prevent most English people from making a prolonged stay in that town. There are not many places, however, more attractive in the spring for some weeks, and Sorrento, with its excellent hotels, offers a charming retreat at that time of year.

Few people suffering from any affection of the lungs would, I think, select Naples as a winter resort. Rheumatism and catarrh are common amongst the inhabitants, strangers are very liable to pneumonia and pleurisy, and phthisis undoubtedly occasions a large proportion of the total mortality. Dr Madden believes that the climate of Naples possesses great advantages for hypochondriacal and melancholic patients, for most cases of dyspepsia, and for persons suffering from a long-continued residence in a tropical climate. When the mind has to be roused, the clear sky, beautiful scenery, and the interesting excursions to be taken in the neighbourhood, will answer the purpose by helping to restore the nervous energy and giving the brain a new train of thoughts to dwell upon.

PALERMO (Sicily), lat.  $38^{\circ} 81'$

It is something, after having seen a place of interest, to be able to describe it, but there are not many writers

able to give their account with such a charming simple novelty and delicate touch of the pen as my friend Dr Henry Bennet. This gentleman, in the fifth edition of his book on 'Winter and Summer on the Shores of the Mediterranean,' brings his readers within sight of Palermo as follows :

"The view of Palermo, as we approached on a clear, fresh, sunny morning, was really very beautiful. The grand range of mountains in the background reaching the sea on each side of the bay and all but encircling the vast and fertile plain, the large white city with its numerous cathedrals and churches shining in the southern sun, the wide tree-planted esplanade or marina, the deep blue water of the sea, all combine to create a sense of loveliness and grandeur which remains ever after engraved on the memory."

Dr Bennet's main object in visiting Palermo was to study the nature of the vegetation with reference to its climate. He came to the conclusion that, compared with the Riviera, the more southern latitude of Palermo, without mountain protection from the north, as the town faces the sea in that direction, gives it as warm a winter climate as the Riviera enjoys with shelter from the north, though not warmer. Palermo is situated on a bay, and although exposed to north winds, is well sheltered on the west by the rocky Mount Pelegrino and on the opposite side by Mount Catalfano. The valley or plain in which the town is built, called by the natives the *Conça d'Oro* or Golden Shell, is one

of the most beautiful and most highly cultivated spots in Europe. The streets are clean and regularly paved with lava, but, as Dr Madden remarks, they offer the stranger a picture of the close relationship of splendour and poverty, the immense palaces which adorn many of them being occupied on the ground floor by poor shops and cobblers' stalls. The environs of Palermo are very rich in vegetable produce; the lemon and orange and the carouba trees, all met with on the Riviera, flourish there. On or about the 17th of April Dr Bennet found peaches set at Palermo as large as small walnuts, and strawberries, he observes, were served in profusion at every meal at the hotel. Oranges were numerous, and he extols the custom throughout Sicily of eating strawberries together with sugar and the juice of an orange.

Palermo is decidedly damper than the Riviera, rain falls oftener, though less at a time, and its amount may not be larger than that of the Riviera; there are heavy dews at night, and the nocturnal radiation of heat must be checked to a considerable extent by the atmospheric humidity. Moreover, the sun being more powerful than on the northern Mediterranean coast, the soil absorbs a larger quantity of heat, so that every condition appears to be united to promote vegetable growth.

The actual yearly rainfall at Palermo is estimated by Dr Bennet at 21 inches with 131 rainy days.\*

\* Herschel in his "Meteorology" gives 22·3 inches of rainfall for Palermo.

Dr Madden considers it as equal to about 25 inches.

Fogs are said to be of rare occurrence at Palermo, but Dr Madden relates in his book that he has seen there as dense a fog as he ever witnessed on the Sicilian coast. These fogs, apparently from their checking radiation from a hot sea and the heated land, feel warm, instead of chilly as they usually do in the north, especially in mountainous countries.

The winds are mainly northerly and westerly. Occasionally, in winter, the sirocco or south-east wind, from the African desert is felt, but this is the only really disagreeable and objectionable wind.

As a winter health resort I should consider Palermo too damp, rather warm, and somewhat depressing. Although I can hardly call the climate of the Riviera *bracing* when compared with that of a hilly or mountainous region, still it is somewhat bracing in comparison with Palermo. Experience certainly shows that a damp climate—I mean a damp state of the atmosphere—does not agree with consumptive invalids, so that Palermo is not apparently a fit place for them. Such a climate I should infer to be particularly well adapted to people who have a great dislike to the cold winter weather in the north, or whose circulation becomes sluggish with age, and also to those who suffer from a weak action of the heart as soon as cold weather sets in. The comparatively small daily range of temperature would be likely to agree with cases of rheumatism and neuralgia, and kidney affec-

tions. Palermo is acknowledged as a very pleasant place for wintering, and suitable in many respects for a residence during the cold season in more northern latitudes.

## EGYPT

Cairo (lat.  $30^{\circ} 5' N.$  and long.  $31^{\circ} 19' E.$ ), on the limit between Lower and Upper Egypt, is situated at 13 miles (21 kilomètres) from the apex of the Nile Delta, and about 1970 yards from the right side of the river, with which it communicates by the "Kalig" Canal; this canal terminates at Boulak, the harbour of Cairo. It is eight hours by train from Alexandria, which, from its situation between the sea and a vast swamp, is unhealthy, and should be avoided as a place to reside in. The climate of Cairo, but more especially that of Upper Egypt, is the driest to which I shall have to refer; and this character suits it peculiarly well to the treatment of consumption. From the southern latitude of this town, it will be inferred that the weather at Cairo must be one of the warmest of the health resorts; it is so, indeed, but there is a want of uniformity in its high winter temperature, from sudden northerly blasts, which detracts considerably from the value of this station in a medical point of view. The period of sunset and the nights are, moreover, particularly chilly from excessive radiation under the clear sky, and the daily range of temperature is great; there



are frequently heavy dews. This accession of cold at sunset and at night, is also met with, although in a minor degree, on the Riviera, but Madeira and Teneriffe are nearly free from it. Of course invalids can keep warm indoors after sunset, and use blankets on their beds, but a certain risk must be encountered, and after a hot day, a cold room at night with indifferently closing windows, may be productive of mischief.

Cairo (and also Middle and Upper Egypt) may be considered as having only two seasons, one comparatively cool, and another very hot. The winter, concerning exclusively invalids, extends over the four months from November to March. At Cairo the mean temperature of the four winter or cool months is as follows :\*

November	.	.	.	.	65·3°
December	.	.	.	.	56·7
January	.	.	.	.	52·9
February	.	.	.	.	54·9
Mean					<hr/> 57·4°

giving a mean of 57·4° ; but this does not show either the lowest thermometer reading at night or the highest at noon. I am able to supply this information from Prince Zagiell's work,† from which the following table is extracted :

\* 'Zeitschrift der Österreichischen Gesellschaft für Meteorologie.

† 'Du Climat de l'Égypte et de son influence sur le traitement de la Phthisie Pulmonaire,' par le Prince Ignace Zagiell, Docteur en Médecine, 1866.

*Mean variations of the thermometer every two hours  
throughout the twenty-four hours from sunrise.*

Hours.			Hours.		
5.15	.	47.7° to 51.1°	5.15	.	72.5° to 63.5°
7.15	.	52.2 to 54.5	7.15	.	59.0 to 55.8
9.15	.	60.1 to 63.5	9.15	.	52.2 to 47.7
11.15	.	65.7 to 71.4	11.15	.	46.6 to 43.2
1.15	.	74.7 to 79.2	1.15	.	42.1 to 39.9
3.15	.	79.2 to 83.7	3.15	.	38.7 to 39.9

It will therefore be seen that the mean lowest temperature is not very far from freezing; indeed, the thermometer occasionally falls to 32° at Cairo, and ice may be met with, but snow is unknown there.

In Middle and Upper Egypt, in summer, the sand becomes so intensely heated during the daytime, that although the radiation is very great at night, still the air remains warm from the direct action of the emitted heat; this is especially the case with reference to the atmosphere near the soil. During that season, in Middle Egypt, the temperature rises in the day time from 90.5° to 104.0°, and falls, regularly, in the night time from 86° to 72.5°; while in Upper Egypt the temperature in the day time ranges from 95° to 113°, and falls at night to from 90.5° to 65.7°.

It is remarkable to what extent the atmospheric humidity in Egypt alters on progressing south from the Mediterranean seaside. At Alexandria the atmosphere is damp, and rain falls much more frequently and heavily than at Cairo. Dr R. R. Madden remarks:—"In Lower Egypt the mummies go to pieces on exposure to the external air, and in Alexandria, where

the air is excessively moist, I observed several mummies melt away in a magazine where I kept them, and decomposition took place after an exposure of forty hours to the humid atmosphere, though the same bodies had resisted corruption in a dry air for perhaps forty centuries" (Th. M. Madden).

Throughout most of Lower Egypt, or that tract of level ground watered by the Nile as it divides and subdivides throughout its delta, before reaching the sea, the humidity is great; but at Cairo the sea air, having deposited its moisture, and the breeze from the south being warm and dry, the atmosphere exhibits a considerable degree of dryness, and rain falls but seldom and in small quantities. On proceeding up the Nile from Cairo the air becomes warmer and drier.

A lady, a near relation of mine, who ascended the Nile to Assouan in a dahabeah this last winter, wrote on the 2nd of February, as follows, from a spot somewhat north of the 29° latitude, on the homeward voyage:—"In general the mornings are calm, but about eleven the wind rises; at one o'clock it becomes so boisterous that we are often compelled to bring up till near eight o'clock, when it nearly always drops. The evenings have become too chilly to allow of our remaining late on deck as we used to do last month. Yesterday, after a peep outside to admire the reflection of the moon's rays on the water, I quickly went back to our comfortable cabin. There is occasionally some white frost on deck. When not under weigh

we have our awning spread out to windward, and it is then impossible to believe we are in midwinter. A stiff south wind took us on yesterday to Bedreshyn, but in proportion as we travel northward the sky is becoming cloudy and the weather uncertain, which is quite new to us after our stay in Upper Egypt. Yesterday, for the second time since we left on this journey, we had a shower of rain, but fortunately it did not last."

Prince Zagiell observes that between Cairo to the second cataract, although the houses are low, dirty, and ill-constructed, no sign of moisture is met with in any of them, and it is to this circumstance and to the dryness of the soil and atmosphere that he attributes the healthy condition of these dwellings. The ground is so hard and compact that it absorbs very scantily the rain that falls upon it, and this water is mostly evaporated by the hot sun before it has time to penetrate the soil; hence, artificial irrigation on a large scale has become indispensable to agricultural purposes. Water is absorbed to a depth of 3 or 4·7 inches at most (8 or 12 centimètres), and the soil below this depth remains exceedingly dry during three months in Middle Egypt and six months in Upper Egypt.

From the 25th of August to the 25th of September the Nile regularly every year overflows its banks, and when the ground, soaked with water, becomes warmer than the surrounding atmosphere, then from two to four o'clock in the morning a thick fog arises, depositing a

mass of small aqueous globules, which quickly disappear as soon as the sun rises. The atmospheric humidity varies with the winds, its maximum amount being observed when the wind blows between the north and north-east, while it becomes quite inappreciable with the wind between south and south-west (Zagiell).

Clouds are very rare; they appear occasionally in December, January, and February. At Cairo there is generally one heavy storm in the winter and a shower or two besides; the frequency of rain having increased since the growth of Ibrahim Pacha's plantations between the city and the river. The total amount of rainfall does not exceed 1·339 inches, while the number of rainy days only equals twelve throughout the year (Lombard); the atmosphere, however, must contain a certain amount of moisture from the occasional heavy dews. During a stay of four years in Egypt, Prince Zagiell observed that rain seldom came down longer than from fifteen to thirty minutes at a time, although, occasionally, in January, it fell for an hour and a half without interruption. In general the rain drops are exceedingly fine and light; a south-east wind usually blows when rain falls. Rain at Thebes is exceedingly rare; and in the Province of Esneh it is nearly unknown. The wind most frequently blows from the north-west, north, or north-east, but particularly from the first direction, the northerly winds enabling boats to ascend the Nile against its strong current. As to the composition of the atmosphere in the valley

of the Nile, according to Zagiell, the carbonic acid it holds amounts to 1 or 2 parts in 10,000 (there are as a rule 4 parts of carbonic acid in 10,000 of air), while in the air of the desert there exists no sign of this gas. These statements are well worth while placing on record with reference to the sanitary influence of the climate of Egypt.

It is a remarkable fact that putrefaction in Upper Egypt is greatly checked—not to say altogether arrested. A piece of meat weighing three kilogrammes exposed by Zagiell to the open air, became after three weeks dry and completely mummified without any decomposition having taken place, as shown by the absence of smell. In 1865, during an epidemic amongst cattle, the carcasses of oxen on the borders of the Nile dried up without putrefying. This he attributes to the dryness and warmth of the atmosphere, and also to saline matters blown about by the wind. He is quite right as far as dryness and warmth are concerned, but I do not think the presence of small quantities of salts in the air have much to do with this phenomenon. Vegetable fermentation, Zagiell observes, is also unknown in those districts. The different kinds of fruit, such as dates, dry on the trees, while in the moist climate of Alexandria, when left on the tree after ripening, they undergo putrid fermentation.

The dead bodies found in the Egyptian tombs at different times, even those which had not been embalmed, were calcined and mummified without



putrefaction. This must be owing to the habit prevalent amongst the ancient Egyptians of exposing their dead during several months to the drying influence of catatombs especially constructed for that object, and in which the temperature was higher than that of the external air; the bodies were afterwards placed in their tombs. In 1865 M. D. Gree died at Kheneh, under the 25° of latitude, and his body was buried in the sand at the depth of three feet. The following year it was taken to Cairo perfectly dried up and mummified, and without any decomposition having occurred (Zagiell). It may, indeed, be concluded that the air of Upper Egypt is possessed, to a certain extent, of antiseptic properties.

Prince Zagiell has observed that in Upper Egypt, when the natives suffer from a wound or an ulceration, they cure within a very short time; gangrene, and discharges from mucous surfaces are exceedingly rare, and soon get well. If, however, the natives contract these affections in another country they often have to return to Egypt to recover. These remarks are very interesting, as showing the favorable influence of the antiseptic treatment of wounds and ulcerations undertaken by climate; a similar object is now aimed at and obtained in most countries by artificial means, according to the method of that distinguished surgeon, Mr Lister.

It is probably the remarkable antiseptic character of the climate of Upper Egypt which appears to afford, to a certain extent, an immunity against phthisis.

This immunity is, I should think, scarcely as complete as it proves to be in a mountainous district at certain altitudes above the sea ; still, Sir James Clark (Climate) remarks that Clot-Bey, a French Physician and Director-General of the Medical Department of the Egyptian Army, states in his work on Egypt ('Aperçu général sur l'Égypte,' 1840) that diseases of the chest, inflammation of the lungs, pleurisy, and pulmonary consumption are very rare. During a practice of fifteen years he met with very few cases among the natives showing symptoms of consumption, and even those cases were doubtful. Strangers from more northern countries are also exempt from the disease ; Clot-Bey, at least, never met with a case of consumption among them, and has seen many cured who arrived labouring under the disease, while others were materially relieved. According to Zagiell, Herodotus, after a prolonged stay at Thebes and in Libya, states that he never met with a single case of disease of the lungs (consumption) in those countries. Celsus recommends Egypt to consumptive patients. Claude Galen states that during a sojourn of many years at Alexandria he only met with a few cases of phthisis, and these invalids were strangers, from Europe.

Prince Zagiell came to the conclusion that there are barely more than three classes of the native population in Egypt liable to suffer from consumption. These are: 1st. The Abyssinians or negroes from Soudan, from Kordofan, and other equatorial countries, especially eunuchs. 2nd. The Saïs, whose business it

is to run in front of carriages and who on that account are greatly heated and perspire abundantly, becoming consequently very susceptible to the influence of cold. 3rd. The Circassian and Abyssinian women, and in general women whose mode of existence is to live indoors, taking very little exercise, seldom breathing fresh air, and hardly ever exposed to the beneficial influence of the sun's light. He never met with symptoms of phthisis, or even with signs of predisposition to the affection, amongst Arabs, Copts, Syrians, Turks, Greeks, or Fellahs, or the Bedouins who inhabit the desert.

The author I quote from failed to observe a single case of bronchitis amongst the inhabitants of Upper Egypt and Nubia; he adds that scrofula is very uncommon, and that hooping-cough, influenza (*la grippe*), croup, laryngitis, pneumonia, pleurisy, in short, all affections of the lungs and air passages are exceedingly rare. The principal diseases in that country, and which attack mainly children, are variola, very common in Egypt, ague of a pernicious type (*fièvre intermittente pernicieuse*), meningitis, and especially dysentery.

We have not many recent data on the beneficial influence of Egypt in cases of phthisis, but I cannot do better in this respect than quote from the experience of the eminent physician, Dr C. J. B. Williams. This gentleman's son, Dr C. T. Williams, has published in a tabular form his father's observations on the influence of foreign climates in consumption.\* The result he

\* 'Influence of Climate in Pulmonary Consumption.'

arrived at with reference to Egypt was that 65 per cent. of his patients who wintered either in Egypt or in Syria, were much improved or improving, 25 per cent. remained stationary, and only ten per cent. became worse.

The climate of Upper Egypt is very interesting to consider in its therapeutical relations. It is apparently intermediate between the usual climate of the plains or low lying districts in Europe, and that of mountains at an altitude of 4000 or 5000 feet, and higher under warmer latitudes.

The climate of low lying districts has, in general, no power against phthisis, although under special conditions, and in a few select spots, the disease may be arrested and perhaps cured in a certain number of cases. In middle and Upper Egypt, however, we have quite a different state of things. It is true that the land lies low with reference to its altitude above the sea, but the conditions of the atmosphere are eminently calculated to check phthisis, and this from two causes. First of all from its dryness promoting the evaporation of moisture from the lungs and air passages; it is, indeed, obvious that the humidity coating the terminal air vesicles of the bronchial tubes, must oppose a slight physical resistance to the passage of carbonic acid outwards through the substance of the lungs and the ingress of the oxygen of the air into the blood. Moreover, the continued removal of the moisture covering the surface of the lungs, through which the interchange of gases takes place, must

create a demand for more moisture from the blood, and therefore an increased circulation through the pulmonary tissue ; which circumstance will lead to a greater absorption of oxygen and a more ready elimination of carbonic acid.

The second reason which accounts for the favorable influence of the dry air of Upper Egypt towards checking the progress of phthisis, is the innocuity of its germs or its antiseptic influence, which cannot be doubted. If wounds and ulcerations on some external part of the body, and therefore in direct contact with the air, heal rapidly, sores in the lungs constantly exposed to a current of this antiseptic atmosphere must equally exhibit a tendency to cure ; in other words, the affected tissue will become predisposed to a healthy state of nutrition.

The season during which invalids should visit Egypt extends from November to March, and they ought to take advantage of the north winds to ascend the Nile so as to reach Thebes by the end of November or beginning of December (Clark). There is an hotel at Luxor at a mile or two from the ruins of Thebes, latitude  $25^{\circ} 39'$  ; it is well spoken of, and consumptive invalids may with advantage spend there a part of the cool season. They can travel about on the Nile, but should bear in mind that unpleasant winds occasionally blow at Cairo, even in March, feeling cold and trying to the constitution, especially after a sojourn in Upper Egypt.

The main difficulty experienced by invalids is to find

out a suitable place to go to in the spring, in order to preserve the beneficial effect of a winter spent in Upper Egypt. I would advise such people to resort to altitude in a warm country, such as the Villa Orotava (1200 feet) or Laguna about 2000 feet above the sea, in the Island of Teneriffe; assuming of course that the patient is well enough to go about and live, within certain limits, in the same way as a healthy person. I would not suggest Teneriffe when the disease is progressing, both on account of the sea journey and also from the misplaced reluctance of the inhabitants to welcome such invalids. Madeira, although rather damp in the spring, might be available at Santa Anna in the northern part of the island, and about 1000 feet above the sea.

There is no place in Switzerland, so early as March or April, safe for consumptive patients returning from Egypt; Bex and Montreux are just fit for invalids from the Riviera about the middle of April. *Les Avants*, where there is a very comfortable hotel 2000 feet above the Lake of Geneva and 3000 feet above the sea, in a remarkably well sheltered position and thoroughly exposed to the sun, might answer the purpose after wintering in Upper Egypt, but on the whole there are few places where dry air and immunity against cold can be found early in the spring. In summer, many stations are available in Switzerland, which will be noticed hereafter.



## CHAPTER VIII

### THE ISLAND OF MADEIRA

MADEIRA and the Canary Island are usually thought of last as health resorts, and yet they offer advantages of no mean value, especially from the circumstance that while there is a winter season on the Riviera, in Italy, and even in Lower Egypt, there is practically none in these countries. The Island of Madeira will be especially useful to persons who, after spending their lives in a hot climate, such as the East or West Indies, return home with a constitution broken down by fever or liver disease. Dr George Harley points out in his recent exhaustive treatise on diseases of the liver\* that this organ in the healthy state is the warmest of the body, and consequently that which has to create most heat; it follows that after a long residence in India, and after relying throughout many years upon the sun for animal heat, the liver will not be unlikely to rebel against the necessity of producing, by chemical work, the heat it requires in England. Under this circumstance a winter at Madeira or Teneriffe, or partly in one of these islands, partly in the other, will be likely to prove very beneficial. All

\* 'A Treatise on Diseases of the Liver,' by Dr Geo. Harley, F.R.S.

those who from some cause, which may or may not be dependent on ill health, have lost the vital power of creating heat within their body, will find Madeira suitable to their constitution. People who feel the necessity of being always clothed in thick flannel day and night, who dare not go out of the house throughout the whole winter, and in whose apartments a temperature of over  $60^{\circ}$  must always be maintained, will enjoy a winter at Madeira and pronounce it a charming climate.

I had under my care, while at Cannes, a middle-aged lady who happened to be one of the very few who spent the summer in this southern retreat, breaking the monotony of the lonely season by resorting for a month or two to the Italian lakes. She enjoyed good health while the warm season lasted, but when winter had set in at Cannes she began to complain of the cold, and became troubled with acute neuralgic pains and cough. Her main symptoms, however, were a chilly sensation, especially at night, together with a failure of the heart's action, attended with fainting, and at times a short and distressed state of breathing, while all her functions were weakened in a marked degree. This condition was observed especially while the dry north-west wind was blowing, and the temperature of her body then fell by  $1^{\circ}$  to  $1.5^{\circ}$  below normal. The effects of the dry air had to be counteracted by hot-water bottles placed round the body, a large fire in the bedroom, and by steaming the atmosphere by the best available means. This lady really enjoyed a sound

constitution, but could not bear the slightest cold; even removal to a residence a hundred feet higher up, where the air was slightly drier and a little more bracing, invariably proved injurious, while she always felt better for a change from her villa, about a hundred feet above the sea, to the immediate seaside. Such cases are admirably fitted for Madeira and the Canary Islands.

Ladies debilitated by family cares or social duties, who want complete rest in a country thoroughly new to them, and in a delightful winter climate, cannot do better than spend the coldest months of the year at Madeira. This health resort will also prove very beneficial to many persons who have attained the ripe age when time has come to give up the toils and cares of life. Let a thermometer be placed under their tongue and their body will probably be found colder than it ought to be, while a hurried and shallow breathing, and a pallid complexion, will show clearly that the circulation is defective. It is especially at night such people feel cold, and no number of blankets can make them warm, while they sleep wrapped up in flannel, so as to save every particle of heat they make. Such people require a constant temperature in their bedroom all night, and may occasionally want the artificial application of heat to their body. These cases do not often progress so well on the Mediterranean coast as might be anticipated, on account of the dryness of the air. The comparative ease with which the Riviera is reached, and the comfort met with on the hospitable shores of the

Mediterranean, tempt many to go there who would have done better in a damper climate. After spending a week or two on the Riviera they begin to complain of the cold, and when the dry "mistral" blows, they will freely express their opinion that the spot does not agree with them. Should they move into a hotel higher up above the sea, they will fare worse, and they will find the immediate seaside suits them best after all. That is just the place where the air may be expected to be the dampest and the evaporation from the skin the least active, and, consequently, where the strain on the functions for the manufacture of heat within the body will be kept down as low as possible.

It is a great mistake to think that because consumptive persons may often fare better at other places than Madeira such a climate is therefore altogether useless to invalids. Now that locomotion by sea, as well as by land, is so much improved in speed and comfort, Madeira, as a health resort, should attract the amount of attention to which it is justly entitled.

A trip to Madeira and Teneriffe I took in the summer of 1878 will give an idea of the voyage and of the comfort and ease with which it is now effected.

On the 14th June I left London with a party of friends for Dartmouth to sail the next day on board the Donald Currie steamer, "Dunrobin Castle" (2800 tons), for Funchal, Madeira. We found the magnificent vessel lying in the quiet waters of Dart-

mouth Bay more like a picturesque lake than a natural harbour, and a steam-tender took us on board ; there was no fatigue, no trouble, no keeping out people eager to assist in carrying luggage, for a remuneration of course. We stepped on board, inspected our cabins, ordered what was wanted for the voyage to be taken down below, and an invalid might have got under weigh without the slightest exertion. Indeed, we had amongst our party a gentleman of seventy-five years of age, who went through the whole trip and spent a fortnight at Madeira, visiting both sides of the island, without ever feeling tired.

As the clock struck noon the huge vessel bound for the Cape got under steam, and thus commenced as pleasant a sea passage as I have ever met with. The impression was being on board one's own yacht, everything was kept so clean ; as the eye wandered over a spotless deck, there was nothing out of its place ; the men employed all knew their work, the cooking proved excellent, and the attendance good. The passengers very soon fell into that kind of mutual acquaintance destined to be but temporary, though so pleasing in many ways, and which makes time pass away agreeably during a sea voyage.

Having left on Friday at noon, the following Tuesday we sighted the Island of Madeira, after enjoying throughout fine weather and a smooth passage. On turning a promontory on the south side of the island about five o'clock in the afternoon, we came in full view of Funchal. The town (30,000



H. B. B. B. B. B.

BAY OF FUNCHAL, MADEIRA (from a Photograph)





inhabitants) is built on a bay and rises somewhat abruptly on the face of the hill. The afternoon was calm and hot, and after we had brought up, numbers of boats came alongside, some of them carrying boys all but entirely stripped, with bronzed skin and a real amphibious nature. They dived for bright coins thrown overboard, and climbed up to our deck to take a header for a slight consideration. The bustle these little fellows created in their efforts to attract our attention, and their gambols in the water, were extremely amusing.

On reaching the shore we were at once taken in hand and kindly assisted through our first difficulties in this foreign land by Mr Jones, the young and active manager of Miles' Hotel, who, stepping into the boat in which we landed, smoothed over every difficulty with respect to payment for the skiff, and gave us a guide to take us to his hotel, while he himself accompanied another party to his hospitable establishment.\*

It was all up hill to Miles' Hotel, and Funchal has hardly a level street in it, but had there been any invalid in our party the bullock sleighs drawn up alongside the landing place would have taken them up. The pavement is so bad and the streets so steep, while there are so few roads in the Island, that carriages are not seen at Funchal; bullock sleighs and riding horses are in general use. It is extra-

\* I regret to have heard quite lately of Mr. Jones's death, which will undoubtedly be a great loss to the English visitors at Madeira.

ordinary what a safe footing these horses have, even on the roughest and most slippery pavement. The stones the streets and roads are paved with, are indeed so worn down into a glazed surface, that people are in the habit of going about in slippers, the soles of which shape themselves to the stones, and prevent slipping. I had with me a stalwart Chamonix guide, whose thick ironshod mountain boots tried him severely on these stones, and created no little merriment among the natives, but he soon became used to the Madeira pavement, and contrived to walk up and down the slippery paved roads in perfect security.

The upper part of the hill, on which Funchal is built, is occupied by villas with charming gardens attached to them, while vineyards disposed in terraces meet the eye far and wide.

The vine on the Island of Madeira is not grown in the same way as in France, where the plant reaches to a height of three or four feet, clinging to an upright prop, a vineyard looking at a distance something like a hop plantation. At Madeira the stem of the vine is bare up to four or five feet, and the fruit-bearing branches are fastened down to a horizontal trellis supported on poles. The road often passes under these vines, which afford a most grateful shade from the hot sun.

Very fine wine is now made on the island, though unfortunately small in quantity. No doubt but that the climate and soil of Madeira are admirably adapted

to the growth of the vine, and that it would flourish if the oidium and phylloxera would but leave it undisturbed.

I think there is no place in the world where gardens can be cultivated and kept in such a state of perfection as at Funchal, which is a sure indication of its climate—warm, and rather moist. The hotel where we took up our residence had one of the most perfect nearly tropical gardens that can be imagined. Some of its walks and arbours were entirely covered by the lovely purple bunches of the Bougainvillea and pale blue Plumbago, while there were also dragon trees and groves of Bananas full of life and vigour; jessamine, orange, and lemon trees filled the air with their aromatic fragrance, and a profusion of flowers growing in bushes or hedges delighted the eye in every direction. This was indeed a charming place, different from the Riviera in ever so many respects. There was, moreover, a feeling of repose at Funchal quite peculiar; the climate invited to absolute laziness, to spend an existence of contemplation, and live in peace with oneself and the whole world. It seemed just the very spot for a careworn and fatigued man of business, or for one whose life had been an endless contest with adverse circumstances, to come and spend a year in perfect quiet of body and mind. The impression was not that of a climate calculated to give strength or renew energy, but to quiet and soothe, where people naturally irritable could find no cause for outbursts of temper, and where a heavy heart with some old open

sore would be lightened of its burden and healed of its wound.

The Island of Madeira belongs to the Portuguese, and is situated about  $9^{\circ}$  latitude north of the northern tropics (Funchal, lat.  $32^{\circ} 38' N.$ ). It is nearly in the same latitude as Cape Cautin (about 400 geographical miles to the east), in which the north-east trade wind begins to be felt, so that Madeira is situated near its origin. According to Dr Grabham's valuable book on Madeira, published in 1870, the population of the Archipelago (Madeira, Porto Santo, and the three Desertas) was then, as stated in official returns, 109,047 souls, showing an increase of nearly 6000 in ten years.

The shape of the island is an irregular quadrangle; it is thirty miles in extreme length and twelve miles in breadth from prominent points; the entire circumference is generally estimated at sixty-five or seventy miles, being formed by a high rocky coast, intercepted at places by deep ravines discharging the water of mountain streams.

The island is clearly of a volcanic origin and thoroughly mountainous in its character, although the hills attain no very great altitude, 6000 feet being their greatest height. They are intersected by very deep valleys, not much above the sea level, and from which they rise abruptly. This affords most picturesque and beautiful sceneries, recalling those met with in the rocky mountains, where the eye looks down on deep, dark "cañons," rather than the landscapes peculiar to Switzerland and Corsica with their open valleys.

and rocky arêtes. The path at one place skirts the edge of a precipice, at the bottom of which, some two or three thousand feet below, lies the finest valley of Madeira, the Grand Curral. On travelling through the Island of Madeira, the scenery consists mostly of a succession of rounded hills; the road from Funchal to Santa Anna, on the north side of the island, often leads up one hill and down it, and then over another of a similar description, and so on, when at last the northern part of the island is reached. There the appearance of the country undergoes a remarkable change. The hills become craggy and abrupt; their face is covered with green masses of ferns, which, falling over the edges of the rocky precipices in graceful festoons, reveal the damp nature of the soil. Very fine trees—the til of the laurel tribe, and vinhatico, a kind of mahogany, are met with. *Daturas* grown into trees and covered with their snow-white blossom now appear on the banks of the streams. Hedges of wild hydrangeas of a dark blue colour, surpassing in beauty any flower of the kind I had ever seen, skirt the irrigation-canals; and further on the road winds through fields of wheat, oats, and potatoes, where the quail gladdens the traveller's heart with its soft metallic note.

While the south side of the Island of Madeira has a hot climate and dry soil, where vines, the sugar cane and sweet potatoes grow luxuriantly, it appears unfit for the cultivation of grain; the north side is much cooler and abounds with springs, of which advantage is



taken for irrigation purposes. A days' journey on horseback from Funchal across the island takes one to Santa Anna. There is at this place a very fair hotel, where our worthy host entertained us most hospitably. The view from the terrace, where seats are placed under the shade of gigantic camellias, is one of the finest in the whole island. Looking down from a height of a thousand feet upon the azure-blue Atlantic, on the extreme right the cliffs of the eastern point of San Lorenzo are seen, with the Island of Porto Santo some twenty miles out at sea. Our trip from Funchal lasted three days; the second day took us to San Vincent, a village a day's walk from Santa Anna, also on the north side of the island, and from thence we returned to Funchal. We either rode on horseback or walked, but the elder member of our party adopted a common mode of travelling in the country, which is being carried in a hammock. The hammock is a netting slung upon a long pole and carried by two men; there is a mattress in it, and curtains connected with the pole are made to draw out, so as to conceal the occupier, and give him an opportunity for undisturbed slumber. I once carried an empty hammock a few steps, with the Chamonix guide at the other end of the pole, but soon had quite enough of it; the weight on my shoulders I estimated at about 50 pounds, and if the person in the hammock weighed 150 pounds, this would give 125 pounds for each man to carry on his shoulder. There were three porters for the day's work; they changed now and then, but

never looked tired, and their pace was a quick, steady walk; on nearing their destination in the evening the walk was modified into a trot, and away they would go as fresh as if they were starting for the day's journey. They usually carried the pole on the same shoulder throughout the day, and on returning to Funchal I had the curiosity of examining that part of one of the hammock-bearer's body, to which he laughingly submitted. The skin was thick and puffy, and its colour red, yellow and blue; it bore unmistakable signs of violent usage, and yet so accustomed are these men to the work, that he did not complain in the least, and gave us the impression that he felt little or no pain in his shoulder. These porters are short built; their dress consists of a pair of white calico trousers and a cotton shirt; they are bathed in perspiration the whole day, and the shirt they wear adheres to their skin as if they had been doused with their shirt on. They appeared to us very abstemious, and to drink nothing of an alcoholic nature, water being their only beverage. Of course they are brought up to this work from youth or they could not stand it.

A similar acquirement of strength from training is met with in most countries, although hardly, I should think, to such a degree. I witnessed, however, last summer in the Alps a feat of united strength and mountaineering skill, perhaps, still more surprising than the work of the Madeira hammock-bearers. Having to ascend the Col du Géant, belonging to

the Mont Blanc range, from Courmayeur on the Italian side, I engaged three porters to carry up several cases of instruments destined to certain experiments on breathing I wished to undertake. The altitude of the Col du Géant is 11,030 feet, and from a small inn between four and five thousand feet below the summit my baggage had to be carried on men's backs. There was a large box weighing 88 pounds, a basket weighing 77 pounds, and another load somewhat lighter. These enormous weights were taken up a very steep ascent, over rocks in some places most dangerous from the uncertainty of a secure footing, and finally over a sharp snow arête so steep on both sides that a slip was imminent at every step. Yet the men carried each of these loads without complaining, and deposited them safely in the hut at the summit of the Col. I sent for a fourth man to assist in taking down the baggage when, after spending three days on the pass, I prepared to return to Courmayeur. Never shall I forget the admirable way in which my large box of 88 pounds' weight was carried down the couloir through which the hut is reached. To see a man with such a load on his back, balancing himself on his right foot, then bending his knee slowly and gradually, and searching for a slight projecting rock several feet below where to land safely the tip of his left foot, could not but make me feel very anxious. Another man was at hand ready to seize hold of the box in case of a slip, and avert one of the principal dangers, that of the bearer having

his legs crushed under the weight he was carrying. It was a great relief to me when the men appeared safe and sound at the Pavillion du Mont Fréty, where mules were in readiness to take down the loads. I feel in duty bound to record the admirable work of these Courmayeur porters.

*Climate of Madeira.*—The main characters of the climate of Madeira are warmth, with a certain degree of humidity, equability of temperature, and very slight terrestrial radiation at night. Its temperature during the twenty-four hours is much less liable to changes than that of the Mediterranean coast, and claims superiority on that account.

The mean annual temperature at Funchal is  $67\cdot3^{\circ}$  (Grabham), the average heat in summer is hardly more than  $70^{\circ}$ , and the mean temperature of the winter season always above  $60^{\circ}$ . There is consequently no very great difference between the temperature of the air in summer and winter. Dr Grabham's table of temperature for Funchal, disposed according to the seasons, is as follows :

Winter	.	.	.	.	$61\cdot20^{\circ}$
Spring	.	.	.	.	$65\cdot39$
Summer	.	.	.	.	$70\cdot01$
Autumn	.	.	.	.	$67\cdot87$

The mean winter temperature at Cannes being  $48\cdot1^{\circ}$ , there will be a difference of no less than  $13\cdot1^{\circ}$  higher at Madeira. The following table shows the mean monthly temperature at Madeira compared with that of Mentone, Pau, and Greenwich.

	Madeira.		Mentone.		Pau.		Greenwich.
	—		Dr Farina, 10 years' records.		Dove's tables.		20 years' records.
January ...	61·89°	...	48·7°	...	41·2°	...	38·9°
February ...	62·70	...	49·1	...	43·6	...	39·7
March ...	64·0	...	52·8	...	48·8	...	41·5
April ...	67·10	...	58·3	...	51·8	...	47·2
May ...	68·40	...	64·0	...	61·6	...	52·7
June ...	68·20	...	70·9	...	68·2	...	59·8
July ...	70·10	...	75·4	...	68·6	...	62·5
August ...	70·93	...	75·4	...	73·4	...	61·9
September ...	70·86	...	69·4	...	68·5	...	57·5
October ...	68·73	...	64·2	...	58·5	...	50·9
November ...	64·96	...	54·0	...	47·0	...	42·8
December ...	62·58	...	49·1	...	42·8	...	40·7
Means ...	66·70°	...	60·9°	...	56·2°	...	49·7°

The mean monthly temperature of Madeira is therefore never very high, never low, and fluctuates between 61·89° in January and 70·93° in August, while the moderate temperature of 46·5° is the most extreme cold on record. The night in which that temperature was registered was exceedingly stormy, and some of the cold rain may, perhaps, have reached the thermometer. On the following morning the first red rays of an almost tropical sun disclosed the tops of the projecting heights around Funchal capped with snow (Graham). Dr. Graham concludes from his observations that the temperature of the air is never less than 47·5° at any place in Funchal 300 feet above the sea, and he believes that it does not fall below 49° at the sea level.

Sir James Clark had formed a very high opinion of the climate of Madeira, and I cannot do better than

transcribe the following passage from his work, part of which I find quoted in Dr Grabham's book.

“From this comparative view of the climate of Madeira it must be readily perceived how great the advantages are which this island presents to certain invalids, over the best climates on the Continent of Europe. It is warmer during the winter and cooler during the summer; there is less difference between the temperature of the day and that of the night, between one season and another, and between successive days. It is almost exempt from keen and cold winds, and enjoys a general steadiness of weather to which the Continental climates are strangers. During the summer the almost constant prevalence of cold easterly winds, especially on the north, and the regular sea and land breezes on the south side of the island, maintain the atmosphere in a temperate state. The sirocco, which occurs two or three times, at most, during the season, and then continues only for a few days (seldom more than three), sometimes raises the thermometer in the shade to  $90^{\circ}$ ; with this exception the summer temperature is remarkably uniform, the thermometer rarely rising above  $80^{\circ}$ . In consequence of the regular sea breezes, the heat is not so oppressive as that of the summer in England often is. Close, sultry days are little known in Madeira, and there is neither smoke nor dust to impair the purity of the atmosphere.”

With reference to clothing, Sir James Clark observes that invalids must not trust too exclusively to



the thermometer ; their sensations are a better guide. Dr Combe remarked during a residence in Madeira that the majority of cases of catarrh and diarrhœa which occurred during the winter were produced by insufficient clothing, and by continuing the use of fruit and slops with the same freedom as during the warm weather.

The annual rainfall Dr Grabham estimates at twenty-nine inches, which, he observes, closely coincides with the results of other observers. The amount of rain, however, is subject to much variation, being as low as twenty inches in some years and exceeding forty inches in others. Autumn is the rainy season, which sets in towards the end of September or beginning of October, and is accompanied by westerly and south-westerly winds, the rains being variable in amount and duration. The weather clears up in November, and generally continues fine and mild till the end of December. The influence of wet weather on vegetation is very striking ; it imparts a vernal freshness to the country, and calls into existence a profusion of spring flowers (Grabham). The rains are tropical in their character, falling in dense intermitting showers, and generally unaccompanied by wind. About the end of December snow usually falls on the mountains, but it is seldom seen lower than about 3000 feet above Funchal.

The month of January is often rainless, and is, perhaps, the driest and pleasantest month of the year, but it sometimes exhibits many days' rain. February is uncertain and is often the wettest, windiest, and

most unsettled month. March is usually attended with fine weather, but sometimes several days in that month are rainy. In April and May there are occasional showers. June is almost invariably cloudy. July, August, and September are sunny and fine. According to Dr Grabham, rain falls annually on eighty days.

The mean yearly percentage of atmospheric humidity in the Island of Madeira is 76 (Grabham). The relative humidity falls frequently in winter below 72, but rises in June, and then often approaches the saturation point, when the island assumes something of the character of a damp, warm greenhouse. Although the weather is so fine in the summer months, the hills are often capped with clouds, especially in its early part, and the traveller on his way across the island in July is pretty sure to meet with fogs and a chilly damp breeze on the highest passes, or at an altitude of three or four thousand feet. It is probably this condensation on the hill tops which maintains the island in a damp condition in summer, the evaporated moisture from the warm Atlantic being confined between the cloud-stratum and the sea, while the trade wind is more or less charged with humidity and by cooling the atmosphere reduces its capacity for moisture.

Later on in the season, the increased heat of the sun dries up the atmosphere and clears it of clouds for a time.

The deposit of dew is a phenomenon indicating a high state of humidity united with nocturnal radia-

tion. In Madeira, dew may be often observed after sunset, although occasionally absent on very damp nights, which Dr Grabham accounts for from the moisture intercepting all radiation, and consequently entirely checking the fall of temperature.

In the winter months there are few days entirely free from clouds, the weather throughout the day being usually as follows :—At sunrise the sky is cloudless, except for a few degrees above the horizon, and the land breeze blows gently down the mountain slopes ; but as soon as the sun's power is felt the breeze moderates and ceases. At about 9 o'clock the moisture evaporated from the sea becomes visible at about 2500 feet in the form of detached patches of mist, and a little before midday the mountains are closely invested by clouds, while Funchal loses its sunshine. The heat of the sun, however, is felt through the mist, and the land no longer parting with its heat by radiation, retains effectually its acquired warmth. At this time a momentary feeling of oppression is felt, probably owing to the increased dampness of the air checking the evaporation from the skin and lungs, and thereby increasing the sensation of heat, while the cooling of the body by radiation is checked to a considerable extent. The stratum of clouds usually continues till 2 p.m., when it breaks up, and a little before sunset the sky becomes perfectly clear.

The nights are almost always cloudless, but never cold, while the stars shine with great brightness. When the north-east breeze is strong, banks of clouds

hang on the eastern extremity of the island. In southeasterly weather dark masses of clouds appear in the sky from the south, and a tropical rain falls.

There are no fogs and mists upon the surface of the sea or land in the lower parts of the island, although Dr Grabham has sometimes observed a mist rolling in from seaward, and remaining for a few hours, at an altitude of 700 or 800 feet above the sea.

The solar radiation or direct heat of the sun's rays, as determined by the black bulb thermometer *in vacuo*, fluctuates from  $120^{\circ}$  to  $135^{\circ}$ . At night, the ordinary fall of a thermometer exposed to the atmosphere (I presume on the grass) is about  $6^{\circ}$  below the reading of a thermometer screened from radiation. With a dry northerly wind the fall is greater, and reaches  $12^{\circ}$  below the record of a shaded instrument (Grabham); the deposit of dew is then copious and early.

A north-easterly wind is considered to blow at Madeira during nine months in the year,\* and according to Dr Grabham's experience it has predominated largely during six winters. This north-east wind is accompanied by its zone of clouds which tops the mountains of Madeira, while it encircles and conceals from the view of passing vessels the famous Peak of Teneriffe, some degrees south.

The westerly wind is essentially warm and humid; its common direction is south-west or west south-west. Funchal is fully exposed to the south-west wind,

\* From November, 1867, to November, 1868, the north-east wind blew on 263 days, and the west wind on 62 days (Grabham).

which, however, seldom blows longer than a day or two, frequently shifting after a few hours to the north-west, and then gradually subsiding. There blows for a few days at Madeira a northerly wind, attended with cold weather, and often possessed of great force; it brings snow upon the mountains, and the lowest temperature felt on the island. The days on which this wind blows are, however, but few, and Dr Grabham observed it from five to ten days only in five seasons, although, he remarks, that the year 1864—65 was largely characterised by northerly weather.

Wind from the east, or a point south of east (Grabham), may be felt occasionally at any time of the year, although its full intensity is only known in summer. It is called the *Leste*, and corresponds to the African “sirocco” or “harmattan.” It is a hot parched current, usually of great velocity; while it lasts all clouds vanish, while the sky appears of a semi-transparent light-grey colour; at night the stars shine faintly, and the temperature falls but little. This wind is said to last commonly three days, but it may have a longer duration. *Leste* weather in summer, with a temperature rising to near 85°, is much disliked; the skin and lips are dry, the throat parched, and the increased heat feels most uncomfortable. The capacity of the dry air for humidity while the *leste* prevails is enormous, and promotes evaporation to a very great extent. On such occasions the dry and wet bulb thermometers sometimes vary by

16° to 18°. Dr Grabham has observed this difference to rise to 21°. Such a dryness, he observes, is difficult to conceive. I have observed, however, a still lower degree of atmospheric moisture on the Peak of Teneriffe, where the extreme variation between the dry and wet bulb thermometers reached to over 30° F. In its hygienic characters the leste wind appears to lessen or arrest the spread of epidemics, and cholera in Madeira subsided under its influence.

The leste wind has been known to transport locusts, arriving alive at Madeira after traversing 360 miles over the sea. There is a peculiar aerial haze attending it, which Dr Grabham apparently believes to be owing to a physical or molecular condition of heated air; but I cannot help thinking that a more satisfactory explanation of the phenomenon will be found in the theory proposed by the late distinguished Professor de la Rive, of Geneva, to account for a very similar phenomenon noticed in Switzerland. In the valley of the Lake of Geneva, when the air is very damp, objects at a distance are so distinctly seen as to look much nearer than they really are; that is a sure sign of rain, and during a succession of damp days the optical delusion is uninterruptedly continued.

On the weather becoming drier the phenomenon lessens and disappears. But should the north-east wind, the *bise*, well known for its dry character, begin to blow, a peculiar haze in the atmosphere is usually apparent, resembling a mist, especially



visible when the eye is turned towards the north-east end of the lake. This haze cannot be of the nature of a fog, as the air in which it forms is particularly dry. De la Rive attributed the transparency of damp air to the influence of moisture on the particles floating about in the atmosphere; these particles are hygrometric, and by absorbing humidity increase in transparency, thereby adding to the clearness of the atmosphere, while the reverse would take place in dry air. A phenomenon apparently similar to that recorded by Dr Grabham at Madeira can be witnessed on the Peak of Teneriffe, where the astronomer, Mr Piazzzi Smyth has observed it, and where I have also seen it distinctly. It is not that a haze must always be looked for in very dry air, for I have observed in the Rocky Mountains of the State of Colorado the proverbially clear condition of the atmosphere, at a time when the air must have been very dry. While staying at the mining town of Fairplay, some sixty miles south-west of Denver, and about 10,000 feet above the sea, I was desirous to visit a river, which was said to require an hour and a half to reach on horseback, across the prairie. On making for that river I sighted it shortly after starting, and clearly saw its silvery track winding through the plain, with its low banks dotted with shrubs. I mentally concluded I had been misinformed, and that the hour and a half meant half an hour. Not so, however, for it took me the full time to reach the water edge; I shall never forget how

surprised I was to find that the river and objects close to its bank hardly appeared to increase in size as I progressed towards the spot.

*Medical aspect of Madeira.*—Having given an account of the climate of Madeira, let us now consider its usefulness in a medical point of view. If there could be a spot where the winter climate and its influence in disease were the reverse of that met with in the Alps, I should say it was Madeira. In the Alps we have altitude and a low atmospheric pressure, dryness of the air, cold winds, snow, absence of vegetation (as everything is under snow in winter), and distance from the sea. At Madeira we find warmth, dampness of the air, a high atmospheric pressure, plenty of vegetation, with the sea in the immediate neighbourhood.

There are few climates we are so well acquainted with in their medical aspect as that of the Alps, and medical authors on Alpine climate agree that its especial character is to predispose to inflammations. All inflammatory diseases of the lungs (phthisis excepted), rheumatism, inflammatory conditions of the digestive organs, &c., are excited rather than relieved in the Swiss mountains. Their influence of a beneficial nature, when within a reasonable altitude (say from 4000 to 5000 feet), is to promote the function of respiration by facilitating the passage of air into the blood through the substance of the lungs, and increasing the capacity of the chest either permanently or temporarily ; to give the organs of digestion new

life and power when in a debilitated condition, impart tone and strength to the nervous system, and rouse the dormant energy of the muscular powers weakened by ill health.

Inversely, the climate of Madeira will exert a tendency to allay inflammatory affections having their seat either in the pulmonary or digestive organs, or in the muscles or joints, or in any other part of the body. Indeed, while mountain climate predisposes to congestion, that of Madeira will lead to an equability of the circulation, relieving any congested organ.

Dr Grabham entirely bears out this view. He states : —“ Also I would especially remark the notable modification in all inflammatory diseases and complications ; the mildness of the eruptive fevers ; the infrequency of hectic in consumption ; and the general exemption of the people from the varieties of acute and chronic rheumatism.”

Hence there exists a most valuable rule as a guidance for patients who are thinking of wintering at Madeira. If their condition presents an inflammatory character, then Madeira will be likely to agree with them. Cases of phthisis, however, whether from pneumonic deposit or tuberculosis, are not probably very likely to benefit at Madeira, and experience is certainly against consumptive patients resorting to that island ; indeed, while a high and dry mountain climate appears peculiarly suitable to these kinds of cases ; low, warm, and damp air does not seem to exert a favorable action on the progress of the disease.

As to the advisability of spending the summer as well as the winter at Madeira, those who are not consumptive will do better to return home when the weather becomes warm in the spring, should they be equal to it; but if consumptive patients find the winter climate of Madeira to have agreed with them, as such may be the case, I would advise them not to return home in summer, but to proceed to Teneriffe, or reside for the hottest part of the season on the north and cooler side of the Island of Madeira, where fair accommodation can be had, although, as a rule, it is difficult to find comfortable quarters in the island out of Funchal.

## CHAPTER IX

THE ISLAND OF TENERIFFE AND A THREE WEEKS' BIVOUAC  
ON THE PEAK

THE Island of Teneriffe, belonging to Spain, is not nearly so well known as that of Madeira, although but 220 miles farther south, while few places can surpass it in interest, and it offers many advantages as a health resort.

Having left Madeira for Teneriffe with the Chamonix guide Edouard Cupelin, on board the African mail steamer Cameron, one Saturday morning towards the end of June, 1878, at 9 o'clock, the next day, about noon, we sighted, for a few minutes, the summit of the famed Peak towering over a mass of clouds. It looked an island suspended high up in the air by some mysterious agency. This view was grand in the extreme, and well calculated to leave an everlasting impression.

It was past five o'clock when we entered the Harbour of Santa Cruz of Teneriffe. The roadstead is open to the south and south-west, although well sheltered towards the north and north-east by ranges of volcanic rocks rising abruptly from the sea to over a

thousand feet. A long and well built pier could be seen, on which stood a lighthouse, while near the shore the harbour was dotted with small boats. The Spaniards love to lounge on this pier in the evening, smoking their cigarette and enjoying the cool sea air ; whilst the semi-nautical population well known in every seaport, who live on passengers going to and coming from passing steamers, we found to be fully represented at the landing place along the pier.

I was soon taken possession of by a boatman, and my baggage was lowered into a small boat. First my portmanteau and carpet-bag were deposited in a safe and convenient place, then followed a number of large deal boxes containing instruments, and next came a case seven feet in length and probably large enough to hold two men. The skipper opened his eyes very wide indeed ; who could be this traveller ? Surely he must have thought I was coming to settle for ever on the island. The goods were landed on the pier, and then such a fare was charged ! Of course a golden opportunity of the kind could not be lost. A cab was soon procured, and my impedimenta were at once taken to the Fonda Española, the only good hotel in the place, where I was first introduced to Spanish hotel life.

The inconvenience at my not knowing the language proved at once very great, as the obliging landlord could only speak Spanish ; but after some trouble he was given to understand I wanted a cart and horse for the next morning to convey my goods and chattels,



over the north-east spur of the island, to Puerto Orotava at the foot of the peak. Simple as it seems to ask for a cart and a carriage for yourself, and to settle about prices, the arrangement turned out anything but easy to conclude. It was finally settled that the cart would be loaded and started at an early hour, while the carriage would be ready somewhat later. The Fonda Española rejoiced in a large dining room opening widely on the passage from the main entrance, where three canary birds in three cages hanging to the ceiling, were singing a merry welcome to strangers, to their native land. After dinner we had a walk in the main square and made acquaintance with the everlasting Spanish guitar, fairly melodious at times, but often somewhat monotonous to our untrained ears. The musical strains had something very peculiar in their nature, as the sound ran from a high to a low note, not unlike when the finger is moved up a violoncello cord while the bow is being drawn across it. The music in the square was kept up mostly all night, and to make matters worse, a brass band struck up under my window about two o'clock in the morning. Late in the evening we walked on the pier, and were much amused at the harbour alive with bathers; they might be seen by hundreds in the gaslight, splashing away and calling lustily to each other, the clatter of juvenile voices sounding far and wide.

The town of Santa Cruz is built at the foot of rocky hills of volcanic origin, separated from each

other by narrow ravines ; and these hills, I must add, look very tempting to the climber.

The trade of the island, at one time brisk and productive, has been restricted of late by the fall in the price of cochineal, and the export of this insect-dye has become much reduced. On the other hand, the cultivation of tobacco on Teneriffe is being attempted, and excellent cigars made of tobacco grown on the island are to be bought at Santa Cruz.

The Island of Teneriffe is entirely volcanic, and consists either of lava or of rocks of a volcanic origin. There is but a thin layer of arable soil over this volcanic material, and the vegetation consists mostly of shrubs, grass, fields of cactus for raising cochineal, some vines, tobacco, and a few palm trees scattered about singly or in small clumps ; while on the plateau of Laguna, which is watered from several springs and is the dampest part of the island, there are fields of wheat and other grain. The scantiness of the vegetation is clearly owing, not only to the want of vegetable soil, but in a great measure to the dryness of the country. Rain is less abundant than at Madeira, and there is a remarkable scarcity of water in the island. Water is very deficient in the Canary Islands ; at Las Palmas, a good-sized town on the Island of Gran-Canary, there is apparently but one fountain to supply the whole population, and this fountain is all day long besieged by women and children fetching water. On the Island of Lancerote, another of the same group, where we called on our

way homeward, the drought had dried up the wells, and so completely cut off the supply of water that this commodity had to be procured from the neighbouring islands, and the place was partly deserted by its inhabitants.

Perhaps the most beautiful vegetable production of the Canary Islands is the banana. In Gran-Canary these plants attain an immense size, and appear to grow wild in a few damp places; it is not rare to see a single bunch of the fruit weighing over one hundred pounds. Their enormous oval leaves falling over gracefully, with large bunches of fruit peeping from underneath, may rank as one of the most novel and remarkable sights of Teneriffe. There was a plantation of bananas in a garden at Puerto Orotava, where I became engaged with some experimental work, which I never tired admiring; and when we embarked on our return voyage, the space in the after part of the ship at the back of the cabins was nearly filled with bananas for Marseilles. The fruit is picked green, but ripens very soon in the hot sun; after ripening it is not long undergoing decomposition. Bananas constitute an important article of food in the Canary Islands; they are to be had very cheap, and the natives never seem tired of them. I am not sure that they are always wholesome for strangers, who may be tempted to indulge pretty freely in the luscious fruit, and find them to act much in the same way as plums or figs. The banana is not, however, always relished at first; it has a soft, velvety, and

yielding consistence, melting in the mouth, while its taste somewhat recalls that of pine-apples, but after eating a few the temptation is often to eat too many.

Plums are plentiful and an abundance of this fruit was sent up to us during our stay on the Peak. They were very nice and juicy, but the supply was often greater than the demand, and they did not keep, so that the mule drivers came in for a large share of them.

The wine grown on Teneriffe has much the same kind of taste as that from Madeira, but with an earthy and rather unpleasant flavour; it is very powerfully alcoholic, and we could drink but little of it at a time mixed with water. A cask of sixteen litres (three and a half gallons) lasted during our stay of three weeks on the Peak for both of us.

The cochineal is a very interesting though less important production of the island than it used to be. Fields of cacti, carefully cultivated, rising to a height of three or four feet, often meet the eye on the low parts of the island. Some of the leaves appear to have been sprinkled over with flour or chalk, while others have small muslin bags hanging astride over the edge, or may be observed wrapped up in cotton rags. A closer examination will show that if the white dust be taken between the fingers and crushed, a purple stain of cochineal is the result. Great care is taken of the cactus and its minute insect, and I could not help feeling for those who had to make their

way through the thickly planted fields regardless of the sharp needle-like prickles of the cactus leaves.

The reader may be interested with the following few details on the cultivation of this insect, kindly supplied to me by a gentleman living on the Island of Teneriffe.

In 1825 cacti loaded with cochineal insects were procured for Teneriffe from Mexico. The plants were given by the "Consulado" or corps of judges of the town of Laguna to three different persons in the island; but a priest in Laguna was the only one who preserved and reproduced the insect, and he subsequently gave up the plants to the Garden Megliorini at Santa Cruz (Teneriffe). From this garden a military officer, Don Santiago de la Cruz, transferred the cactus to the south of Teneriffe, and also to the Island of Fuerteventura of the Canary group. This gentleman, however, met with great opposition, and it was only about the year 1845 that the exportation of the cochineal began to take an important development; it continued progressing until a few years back, each crop producing six millions of pounds' weight of the insect. For the last four or five years the price of the article having considerably fallen in the market the production has diminished.

The cochineal mothers are deposited on linen stretched over a kind of frame; a piece of calico or rag large enough to cover a cactus leaf is then placed over the linen, to which the larvæ adhere; when charged with insects the calico is removed, and another piece substituted for it, the operation being repeated

ten or twelve times a day. The rags bearing the young brood are placed at once on the leaves, and left there three or four days, allowing a sufficient time for the cochineal to become attached to the epidermis of the leaves. Throughout the winter the rags are left on the leaves, to which they are firmly bound in order to protect the delicate insects from rain. The process is very costly from the quantity of linen required, but there is a cactus, "*Opuntia tomentosa*," requiring less protection for its microscopical colony than the common variety, as the velvet-like surface of its leaves enables the insect to become more securely fixed to it, and better able to resist the inclemency of the weather.

Besides the plan of collecting the young insects on linen, the mothers are sometimes placed in long muslin bags, which are left astride on the leaves, the offspring finding their way through the muslin to the plants from which they are to derive their subsistence.

The crop is collected by means of brooms and scrapers shaped like a spoon. A woman can gather in baskets as much as about a hundred pounds in the day. The insects are killed by being shaken up in bags or by exposure to a certain heat, they are finally dried either artificially in pans, or in the sun.

There is a very interesting botanical garden some little distance above the Harbour of Orotava. It belongs to the State, and is managed by a Swiss gentleman, Herr Wildpret, who obligingly showed me all over the grounds, and most kindly presented



me with a collection of seeds. This gentleman has an extensive botanical knowledge, and takes the greatest interest in the garden under his care. It must be hard indeed for a man with such a cultivated mind to spend his life in a retirement apparently little better than exile. There is nobody with whom he can exchange his views and ideas on his favourite subject; and with but a small stipend to keep up a large family, his life is entirely devoted to his garden and botanical pursuits. He deplores the want of a good hotel for invalids at Teneriffe, and no doubt is perfectly right. The Spaniards at Teneriffe simply decline, I am told, to receive consumptive invalids in their hotels, as, I understand, they consider that illness as contagious. A letter in the 'Times' from the British Consul at Gran-Canary, whose acquaintance I had the pleasure of making, fully confirms this statement. At present the only English boarding-house on the island is to be found at Puerto Orotava, where Mr and Mrs Turnbull are most liberal and cordial in their hospitality, which they will be happy, I am quite sure, to offer people in bad as well as in good health. Unfortunately their house, when I was at Teneriffe, was not calculated to accommodate a large number of guests.

The morning after our arrival at Santa Cruz my companion informed me he had seen my heavy baggage off for Puerto Orotava at an early hour, safely packed on a cart drawn by a mule; but he thought there might be some misgivings as to the

wretched animal ever reaching Puerto with such a load. The distance we had to travel was to take us six hours with a light vehicle, and our carriage drove to the door between eleven and twelve o'clock, when we at once started for Puerto. The peak is not seen from Santa Cruz, and as we rose on the hill at the back of the town, we strained our eyes in vain to discover it. We passed fields and fields of cacti, some of them with their leaves well powdered over, and others looking at first sight as if a shower of rags had blown over them and been caught up by their prickles, but on a closer inspection the rags were observed to be carefully tied round the leaf; otherwise the country was very bare. About half way we stopped at the town of Laguna, where the British Consul resides in summer. I called upon him, and he received me most kindly, giving me a great deal of very interesting information on the island. He said, if I mistake not, there were only twenty-four English residents at Teneriffe, although a number of English vessels called at Santa Cruz, which kept him busy.

Laguna, properly "San Cristobal de la Laguna," on account of a marsh or lake which existed in its neighbourhood, and formerly the capital of the island, is situated at six miles from Santa Cruz and on the summit of the hill which forms the north-east projection of the island. Its elevation is about 2000 feet above the sea, and it is built on a plateau, which measures perhaps three miles across. From its elevation, Laguna enjoys a summer climate much cooler

than that of Santa Cruz, the capital of the island. North and north-west a succession of hills intervene between the plateau and the seaside, while the road to Puerto leads down towards the sea in a westerly direction.

Away our horses trotted, and as we turned a corner the peak burst suddenly into sight. It looked grand indeed, with its terminal cone so white that we thought it must be covered with snow; a nearer acquaintance, however, proved this white material not to be snow, but pumice stone; that is, I presume, the circumstance which gives the island its name, as Teneriffe is derived from Tener Yfe, Tener snow, and Yfe mountain, in the Guanche language.

At last we saw below us a small harbour with a schooner in front of it; the roofs of the houses next became visible, and then we drove down the steep and roughly paved main street of Puerto Orotava, bringing up in front of a Spanish-looking building, with a large door admitting into a spacious courtyard, and stairs on the left-hand side which lead up to a balcony. And there I was greeted by the landlord, Mr Turnbull, with his genial smile and unmistakable Scotch accent; a hearty welcome he gave me, and I shall be ever grateful for the attention and kindness both he and his wife showed me during my stay on the island.

The small town of Puerto stretches some little distance along the seaside; the coast here is remark-

able, being formed throughout of lava which originally descended from the peak. This is a hard, black rock, with a rough granular surface, which at some places stretches far out at sea. The waves have hollowed out the lava in various places into small basins, while at the water's edge it has been worn into projections of every size and shape. These dark volcanic rocks exhibit all kinds of fantastic forms, rising in some places into huge jagged masses, while deep excavations or singularly-shaped fissures are visible close by. A little further on, a gigantic lava pinnacle may come into view pierced with a round hole at its base, through which one is tempted to creep to find out what new and extraordinary freak of nature may be discovered on the other side.

Every now and then a deep hollow report just under our feet would tell of some submarine cave, into which the sea dashed from outside, making the rock actually quiver. Some of the natural basins we used to bathe in, although the water was occasionally too deep for anybody but a swimmer; in other places it was too shallow, and on the whole the coast is not convenient for bathing.

A number of boys, with dark bronzed skins owing to constant exposure, loved to roam about these rocks, having divested themselves of their clothes, and appeared to spend a part of the day taking headers and swimming about. How these amphibious beings could stand the burning rocks with their bare feet is more than I could make out, and as for the sun, which

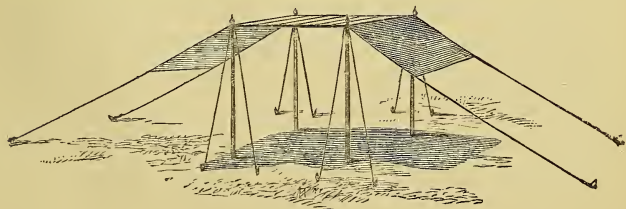
at times was extremely hot, they did not seem to mind it in the least.

The Spanish cemetery is situated just out of the town near the sea; it is walled all round, and one of the most beautiful specimens of the bougainvillea I have met with, either in the Canary Islands or at Madeira, grew upon the wall, graceful bunches of the rich purple blossom falling over it.

The evening at Puerto was the time of day for out-of-door exercise, and between eight and at ten o'clock the small harbour, with the only sandy beach in the neighbourhood, was the general resort of bathers. The guitar helped the inhabitants to while away the evening, and the shoemaker and greengrocer appeared quite practised on this instrument as they sat in front of their shops after sunset, playing and singing. There were establishments for the sale of wine, but they appeared to be very few and of a low order. I made the acquaintance of a few English residents at Puerto; they greeted me very kindly and have left me a pleasant recollection of my visit to the island. One of them had accompanied Professor Piazzzi Smyth in 1856 in his memorable stay on the peak.

A day was spent preparing for our departure for the peak, and making up the baggage into the most convenient shape for packing on mules. I proposed spending three weeks on the mountain engaged with the experiments which had taken me out to Teneriffe. Such a long sojourn out of the inhabited world, and certainly not within easy reach of supplies, made it

necessary to be well stocked with provisions. I had procured in London a large boxful of various kinds of tinned preserves, and these formed a considerable portion of one of the mule's load. Then there was a tent and its accessories, and two portable bedsteads with bedding, from Messrs. Silver in Cornhill; our cooking apparatus was of a most simple and compact description, consisting of the bucket canteen from the same firm, which we found admirably adapted to our purpose. The plates and soup tureen were made of enamelled iron and could not break, while the stove, which also fits in the bucket, was quite large enough for our purpose. The bucket itself proved very useful for carrying water, and the cover for holding water to wash up after our meals. I also carried a wooden shed made of six separate boards fitting side by side, and forming, when put up, a flat roof supported on four poles, these being maintained in their position by tent ropes and pegs, while awnings nailed to the roof and stretched out by ropes fastened to pegs increased considerably the sheltered area. The structure is pictured in the subjoined woodcut. This arrange-



ment served as a protection against the direct rays of



the sun, and proved most useful, not only towards our comfort, but also with respect to my experiments, as I wished to do away with the immediate influence of the sun upon the body. My instruments were all stowed away in boxes and bags in readiness for packing on the mules.

I was uncertain as to the best place to make my first station on the peak. I wished to have at least two camps, the first at an altitude of seven or eight thousand feet, the second as near as possible to the summit, which reaches an altitude of 12,200 feet above the sea. One of the main conditions for any site fit for camping upon is the presence of water. Now, water is extremely scarce on the Peak of Teneriffe, and one of the very few places where a narrow stream of spring water threaded its way down the rocky slope was to be met with at the foot of the "Guajara," the highest of the volcanic chain of mountains which encircle the old Teneriffe crater. Mr Piazzzi Smyth had selected the summit of this mountain (9000 feet) for one of his astronomical stations; I thought it would best answer my purpose to remain at the foot, on the level of the old crater.

On Wednesday, the 28th of June, at 7 a.m., four mules were standing at the door of Mr Turnbull's Fonda Inglesa at Puerto Orotava, and the work of packing was commenced. A fifth mule had to be pressed into service, and a horse came round with its driver, in case I should wish to ride. The mule drivers showed themselves most expert in packing,

and the poor animals submitted patiently to much pulling about and tightening round the body with cords. Many of them were in a wretched state, covered with sores, and so thin that their diet must have been reduced to the very smallest amount of food consistent with life. A number of dogs joined the party, and I soon discovered the fondness of these animals for the mule drivers who owned them. Their masters, however, did not appear to pay much attention to them, yet these faithful animals would follow at their heels, making an occasional start in pursuit of a rabbit, bounding over the rocks, barking and howling, and out of sight in a moment. The men urged them on, exciting them with their voice; after some time the animals would return panting for breath with their tongues hanging out, as if to say that a drink of water would be very welcome, but they did not get any, and resuming their post near their master, would walk on, putting up with thirst, though ready for the next run if the track of another rabbit happened to be crossed.

These dogs, like the mules, are ill fed and usually in bad condition, still they put up patiently with such hard lot. Their breed has something of the spaniel and deer hound; with their long legs and light body they clear a considerable space of country within an incredibly short time. The mule drivers use them frequently for rabbit hunting amongst the rocks and retama bushes\* (kind of broom) which skirt the old

\* The Retama Blanca in Spanish, or "*Cytisus Nubigenus*," is very

crater of the peak. I am told the men pursue the rabbits with sticks; the dogs drive the animal towards the spot where their master is standing, when it is felled with a blow. While encamped on our "Guajara Station," a man engaged in this kind of sport called at our tent with several rabbits for sale; they appeared to belong to the grey variety common in England.

Before taking leave of our obliging host, I had arranged with him that he would send us fresh supplies to our camp once a week regularly, and as the post with the English mail came in at Puerto usually on Mondays, his messenger was to be sent up every Tuesday. He turned up regularly with the letters, six numbers of the 'Times' newspaper, and many good things in the way of bread, meat, potatoes, bananas, plums, &c.

The start excited some little interest amongst the inhabitants, as the peak is but seldom ascended, and but with very rare exceptions visited by the natives; while nobody since Mr Piazzi Symth in 1856 had done more than ascend the peak, and come down again without making any stay upon it. The mountain as it rises from the sea is skirted by low foot hills, which become steeper as the altitude increases, but no difficulty whatever is met with in the ascent.

After leaving Puerto we passed two round hills standing out like huge tumuli. One of these mounds common on the Peak of Teneriffe, at an altitude where nearly all other vegetation has disappeared.

rose to about 1000 feet above the sea, and might have measured from six to seven hundred feet from base to summit; the other was smaller; the air at the time was still clear out at sea, cloudy overhead.

We entered the fog stratum floating around the peak at 1 p.m. and at 3200 feet above the sea, the fog then driving from the east. A call for a halt for dinner at 2 p.m., while full in the fog, was cheerfully responded to, the mules were unloaded, and the whole party dispersed among the ferns. Nothing could be more picturesque than such a large gathering of mules, dogs, and drivers, while I and my companion selected a quiet spot where we could enjoy our meal away from the chatter of our men. Every now and then they appeared in the fog, magnified into giants, and then vanished again, when all of a sudden the fog would be wafted away for a minute, and the whole party suddenly burst into sight within a short distance of us.

After our meal the mules were soon loaded, and leaving at 2.30 p.m. a decided increase of temperature was noticed at an altitude of 5200 feet (by aneroid barometer), although the mist was as thick as ever. The breeze was then blowing north by west; soon after the fog became thinner, and the sun's light brighter, and at 5500 feet we emerged into the clear atmosphere, with a dark spotless blue sky above. To our right rose the majestic peak, from which, however, we were still separated by a wide plateau; to our left appeared the high volcanic mountainous ridge en-

circling the peak, the highest of which, Mount Guajara, was still at a considerable distance. We had hardly reached, however, the spot called *El Portillo*, where admittance is gained into the large circus, considered as the original crater through which the present peak arose.

Before being fairly out of the fog, light curls of mist drifted past us from the north-east at the rate of between five and ten miles an hour, and again disappeared; and there I stood watching the transformation, ever in progress at the upper surface of the trade wind clouds, where the fog dissolves and floats upwards as invisible vapour into the south-west return current.

The thickness of the cloud stratum (by aneroid measurement) amounted at the time to 2300 feet, the whole mass moving upwards at the rate of between five and ten miles an hour, although hardly ever reaching higher above the sea.

When quite out of the fog the heat of the sun became very powerful, and the stones were hot enough to be unpleasant to stand upon for more than an instant. We entered the circular belt round the peak known as the Cañadas at about 5 p.m., and rode along a flat volcanic sandy course, with a circle of high rocks limiting the Cañadas on our left. To the right extended first of all a flat, sandy, and stony plateau dotted with retama bushes, but, as we moved on, the stones and sand gave way to masses of black lava, amongst which the retama still flourished.

Being unacquainted with the language, I could obtain no information as to the distance we still had to walk and the position of our camp. Our eyes kept gazing on the peak, and for a time I was under the impression that a white dome-shaped elevation, apparently about 3000 feet below its summit, was our destination, but where was Mount Guajara? The want of water was greatly felt, as the mule drivers had made short work of that we had taken up with us in casks, and we were greatly parched by the heat of the sun and extreme dryness of the air. My attempts at inquiry from our guide or head driver by repeating the word "agua" proved fruitless, and we were compelled to be patient; I had, however, some misgivings as to the existence of water anywhere on that desolate mountain, where no vestige of dampness could be seen, or no sound of the slightest distant ripple could be heard; and I must confess that the idea of finding no water at our destination rather gained ground than otherwise as we tramped amongst the stones. It was a relief, indeed, when the sun had fairly set; we made haste and escaped to some extent, by active muscular exercise, the intensely chilly feeling due to the radiation to which we were subjected. On we walked between a wall of lava on one side and the hills on the other, the passage at times becoming a narrow defile. The shades of night had now quite overtaken our party, and we could see little beyond the stony track we were following, when we commenced ascending a rocky slope on our left, and presently a fire, obviously



a camp fire, came into sight. We had at last arrived at our halting place at the foot of Mount Guajara; it was about half past eight when the men began to unload the mules, which were tethered to pegs driven into the ground, and then served with a small allowance of beans. A fire was lighted by the men, who squatted down round it talking merrily, and appearing but little tired, while they took no notice of the cold. As for ourselves, it was not long before one of the men had shown us a spot where a tiny rivulet was actually found threading its way between the stones, and which he pointed to exultingly, calling out "agua." We took in deep draughts of the cool and delicious beverage, and then lighted a fire on our own account. It was so dark that we had some difficulty in finding a convenient spot where to pitch our tent for the night, and the only place at all fit for it was still considerably far from horizontal. Here, indeed, were the troubles inseparable to an expedition of this kind to commence. The tent was unpacked and pitched, the pegs refusing at first to be driven into the hard stony ground, though yielding after much hammering and persuasion. Inside the tent I crept with the lantern; much had to be done to make the floor fairly even, and then we proceeded to put up the bedsteads. My inexperience led me to place them in the direction of the slope. It must be explained that these beds consist of a strip of strong canvas sewn

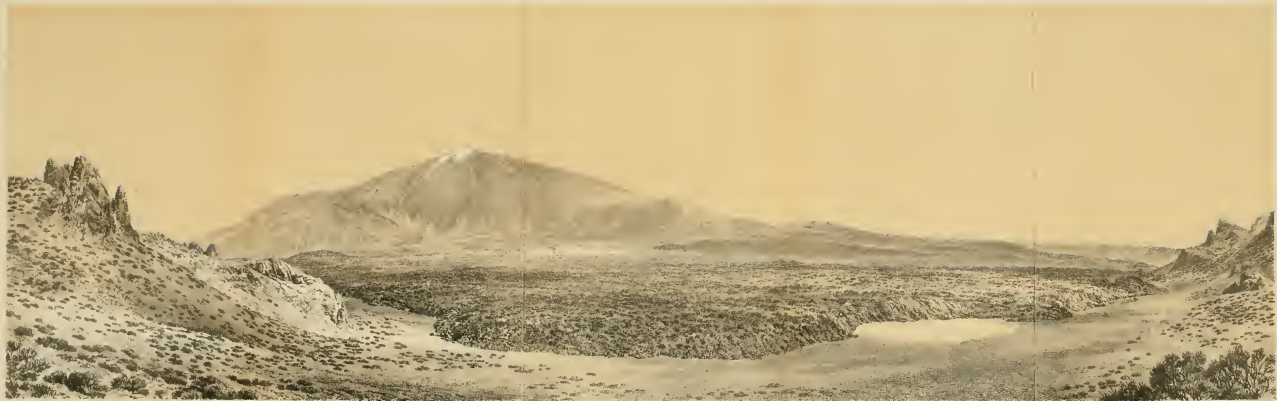
into narrow tubular bags on both sides, through which jointed poles are passed. These poles have holes cut into them, made to receive the ends of three pairs of cross-bars, acting as stands,—one pair at both ends and another at the middle; thus the strip of canvas is thoroughly stretched, and kept in its position while a person is lying upon it. We had, moreover, mattresses, blankets, sheets, pillows, and indeed complete bedding for two beds. As soon as the beds were put up I lay down on one of them to try it, but lo, and behold! the bed being on an inclined plane, the weight of my body carried it forwards; a second later the three cross-bars were broken, and all came to the ground with a crash.

This was, indeed, a bad beginning, the more so as Cupelin, who is by trade a carpenter, pronounced it impossible to repair the damage. However, he obligingly said he would sleep on the mattress without a bedstead; although his lot from this circumstance was to be a hard one, still his slumbers were none the worse for it, and I can bear testimony as to the soundness of his sleep the whole time we bivouaced on the peak. Our canteen next came into requisition, and after supper, having placed my bedstead sideways to the slope, we turned in.

The next morning revealed our position, of which we were without the slightest idea, having encamped in complete darkness, and it struck me at once that an excellent place for the tent could be found within a very short distance, on a perfectly flat surface of

pebbles and sand, extending from the foot of the hill on which we stood to the ridge limiting the extensive level tract of larva which separated us from the peak. There were a good many retama bushes about, some of them quite dead, their branches having been set fire to, and these could supply us with an unexhaustible amount of fire wood, while water was only at a quarter of an hour's walk. We therefore lost no time, the tent was struck, and taken down to a spot selected for our camp, and there it was put up and carefully secured; this we had no trouble in doing as the ground admitted of the tent pegs being driven in firmly. The tent measured 7 feet 2 inches on one side, 7 feet 5 inches on the other, and its height from the ground was from 6 feet 8 inches to 5 feet 8 inches, as it fell in a little from the median line. It had seen active service in the Swiss mountains, and had stood for eight days on the Col St Theodule, near the hut, with its roof partly covered with snow and ice most of the time.

We had an excellent level floor made of fine sand and clay baked in the sun. The tins of preserved food were now unpacked and disposed in several tiers all round the inside of the tent close to the canvas, thus taking very little room and being safely stowed away. Our two beds were placed so as to leave a passage between them in which there was just room for a small table. We had soon picked up enough wood for a large fire, which crackled merrily, sending up wreaths of light-coloured smoke; water was fetched



THE YUKON RIVER AND MOUNTAIN RANGE—THE SUMMIT OF THE PEAK 5070 FEET ABOVE THE LEVEL OF THE TRAILER AND 1200 FEET ABOVE THE  
 LEVEL OF THE RIVER—THE RIVER IS THE YUKON RIVER—THE PEAK IS AT THE FOOT OF MOUNTAIN RANGE  
 (SEE PAGE 120)



from the brook, and the experimental baggage unpacked. I found the instruments uninjured with but few exceptions, one of my thermometers being unfortunately broken.

The next thing to be done was to put up our wooden sun-shelter, and this was soon satisfactorily accomplished, the long axis of the shed being as near as possible east and west, so as to make the most of our shelter throughout the day. The mercury barometer was secured to one of the poles, while a perforated box holding my thermometers was fixed to another pole in such a position as to be sheltered most of the day from the direct rays of the sun, while freely exposed to the air. Pieces of wood were nailed underneath the roof of this shed, and to these other thermometers were attached. We had folding chairs with us which proved very useful while engaged with my experiments. In the forenoon of that first day of our bivouac the mule drivers took leave of us; I retained one of them in case he might be wanted as a messenger, but after a day or two I also sent him back, finding no employment for him. This man had the most docile and obedient dog I have ever met with. As the nights were very cold from the intense radiation under so clear a sky, I thought it would be interesting to ascertain whether water would freeze at night when exposed to the atmosphere. A soup plate full of water was therefore placed one afternoon on the sand which was then burning hot. The poor dog, which had barely quenched his thirst throughout the



day, was not long in finding my soup plate of water. I was on the spot at the time, and as the animal was just taking the first sip, I pushed his head aside somewhat sharply and gave him a friendly castigation. His master came up and assured me the water would now be left untouched. So it was, and the next morning I found the plate full of ice. I really felt for the dog, who went prowling about the camp all night, feeling, I am sure, extremely thirsty and knowing there was water close at hand.

The plateau on which we were encamped extended about 300 yards from the tent in a northerly direction towards the peak; the baked clay was fissured in every direction, and through these fissures there grew numbers of small green thriving plants of the mint tribe, and strongly possessed of its characteristic smell. It was a perfect wonder to me that anything should grow in such a dry soil, but the roots of these plants apparently derived moisture from the brook after it had filtered a long way through sand and clay. A walk in the northerly direction took us to a wall of masses of lava tumbled about in an extraordinary manner, amongst which there were quantities of dead retama wood, some lying about and some still standing. Climbing up the wall or parapet of lava, which was some thirty feet high, was easy matter, and brought us on the lava bed, extending to the foot of the peak at a distance of two or three miles. Such an unpenetrable chaos of black rocks can hardly be imagined; still even here the retama

bushes thrived, at all events, within some distance beyond the ridge of the lava bed. We were much surprised at discovering a number of beehives at this place; they were very rudimentary, consisting of trunks of trees hollowed out, and standing side by side of each other. At first we could not understand the use of these old trunks; Cupelin, who kept bees at Chamonix, declared they were hives, but we could not see any bees, so going up cautiously to one of them he moved aside the hollow trunk very gently when out came the bees, and he was stung by one of them, which clearly disliked the intrusion. The man I have formerly alluded to as hunting rabbits with his dog on the peak, actually lived in these solitary regions, sleeping inside a cairn made of blocks of lava of his own construction. His apparent business was to look after these beehives. He offered us honey as well as rabbits for sale.

On our way from Guajara to our highest station, we came upon a much larger number of these beehives; I counted over 140 of them in several rows, looking from a distance like an army of little soldiers. Near this spot there was a party of eight or nine men and children squatting down, and who were probably the owners of the hives. The bees fed upon the retamas which were then in full bloom.

We very soon settled down to our new gipsy-like mode of existence. I was usually awake first, as the cold at night allowed me but a few hours' sleep; and on several occasions the first dawn of light found me

testing my temperature with a thermometer and taking notes. Cupelin was up and about before five o'clock (the sun rose for us at 5.54 on the 4th July), and brought me a cup of hot coffee, after which I was soon ready for the day's work. Water, always a scarce commodity, was used as sparingly as possible for washing. The first business of the day was to shoulder a cask and proceed to the stream—my companion undertook that duty;—the cask containing eighteen or twenty quarts of water served usually for the twenty-four hours' consumption. Then we set to work experimenting under our wooden shed until an unmistakable craving called for breakfast. After some discussion as to the bill of fare a soup-tin was usually opened and its contents duly heated in the saucepan. These soups we found excellent, and I can recommend them strongly, one tin constituting quite a meal. I cannot say as much of several of the other tins we had brought out. The Australian beef proved unpalatable and much too fat; we had to throw some of the fat away and boil the meat with water into soup. The proportion of fat with the bacon was also much too great. We turned the grease into account as we ran short of candles, and used it in an extempore lamp, made with a small empty tin and a piece of wick from the supply brought out for the wet-bulb thermometer. But like what I think most people would have done, we got through our best tins first, and during the last few days of our stay on the peak experienced, on that account, some scarcity of good food.

After breakfast we again resumed our experiments under the friendly shelter of our wooden roof, and at about 2 o'clock had dinner. As we were our own cooks, we had to give up rather too much time to the preparation of this important meal. We often had fresh meat in the form of beefsteaks ; these were fried in an abundance of batter, the canteen stove and frying-pan being just the thing for the purpose ; we kept turning the beefsteaks with a stick pointed at one end, giving them now and then a gentle poke until softness revealed sufficient cooking. While the steaks were frying we sat close by on a large stone peeling the potatoes and cutting them up ; they soon crackled in the frying-pan and were always pronounced admirably done. After the meat and potatoes came the marmalade, and then a cigar. These were our best dinners. Fresh meat ran short at our upper station, and potatoes were too scarce to allow of our partaking of such dainties every day.

The meat kept fresh to a most unexpected extent, as I had been under the impression that the intensely hot sun would make short work of it. A piece brought up from Puerto was placed on the top of the shed, and another hung up high on the shed poles away from the dogs ; and we were supplied with fresh meat the whole of the eleven days spent at our Guajara station. The beef became, however, hard and horny, and flies provokingly deposited their eggs inside ; but it emitted no smell, and clearly escaped decomposition. My companion had a peculiar horror for flies' eggs, and used to

spend a considerable time in picking them out one by one with the end of his knife, before he cut off the slice destined to become a beefsteak. I could not convince him of the uselessness of so much labour, and that a few eggs more or less in the frying-pan did not matter much. It is very singular that meat should thus keep free from decomposition under a tropical sun. The dryness of the atmosphere was apparently the main cause of this phenomenon. At our second station at an elevation of 10,700 feet, where the air was not quite so dry as it had been at Guajara, fresh meat sent up from Puerto underwent decomposition after a few days, and became unfit for food.

On the American prairies the Indians preserve their buffalo meat by cutting it into strips, and allowing it to dry in the sun hanging at their horses' saddles. While out buffalo hunting in the State of Nebraska, in 1873, I was very much surprised to find that buffalo meat, of which we had an ample supply, actually showed no signs of putrefaction when hung up to our tent poles or to the horse's saddle. I kept a small piece dried up with the intention of bringing it home with me, but after some weeks it became musty, although showing no actual signs of putrefaction, and I threw it away. The air on that occasion was extremely dry, the weather being at the time very clear and hot. I cannot think that organic germs were absent in the midst of the vegetation of the prairies, but apparently as soon as they alighted on the meat, it dried up and they became powerless.

The antiseptic power of the dry air in Upper Egypt appears to be of the same character.

While at our Guajara station, which was 7090 feet above the sea, we spent our time pleasantly, having plenty to do and taking no notice of the sun, which was most powerful. To give an idea of the heat of the direct sun's rays, it may be remarked that Mr Piazzzi Smyth, Astronomer Royal for Scotland, while on the summit of Mount Guajara, 1750 feet above my station, reckoned the temperature of the direct sun's rays at  $212.4^{\circ}$ , or a trifle over the boiling point of water at the seaside. It is surprising that men and animals should be able to bear such a heat without suffering from it, but the cause of this immunity is to be found in the power possessed by the living body of transforming heat into motion. Increased perspiration is one of the means of disposing of the sun's heat, and no doubt that an enormous evaporation from our body took place while the sun was above the horizon. After some days our skin dried up to such an extent that it became white and scaly, and extremely brittle, so that the slightest scratch made a sore into which fine dust soon found its way, preventing the healing process; our hands became so painful as to be a constant source of complaint. Washing up after meals—which was my companion's business—found little favour with him on that account. The effects of the atmospheric dryness were very interesting to observe. I noticed, as Mr Piazzzi Smyth had done, that deal boxes readily cracked and split; then, while writing



under the tent, there was no need of blotting paper, the words drying up as fast as they were written. The leather of our boots cracked, and the soles gave way as if they had been burnt, so that after our three weeks' stay on the peak they were in a very dilapidated condition.

Perhaps the most remarkable effect of the physical action of dry air is the great readiness with which bodies under its influence become electrified. On slipping into bed, I was at first greatly surprised at a luminous flash appearing under the bedclothes. This led me to rub the sheets and pillow-case with my hand, when bright white streaks were produced. I showed this to the "guide," and we amused ourselves with trying how we could obtain the brightest light. Friction with the hand on a sheet of india-rubber cloth which covered our beds caused the most vivid flashes; they looked exactly as if the cloth had been rubbed with phosphorus and the luminous appearance brought out afterwards by drawing the hand over the spot. This, however, is no new phenomenon, and is clearly of the same nature as that observed in Canada. The 'Times' of November 22nd, 1878, contains a curious letter on the subject, stating, apparently on good authority, that gas jets had been kindled at Government House, Ottawa, by the fingers of persons who, having trailed their feet along the carpet, and thus filled themselves with electricity, applied their finger exactly over the orifice of the gas-pipe. The author of the letter adds that he has lighted the gas himself holding a knitting needle

over the pipe, and has frequently seen it done by the finger.\*

The 8th of July had been fixed for the day on which the camp was to be moved. We had reached the place on the 26th of June, and on the afternoon of the 7th of July, which was remarkable from the appearance of fine light and beautiful delicate-looking clouds, a caravan of five mules and one horse, with their drivers, was seen at a distance entering the kind of circus in which my tent was pitched. And now an irretrievable misfortune happened. One of the mules made right for the wooden shed, and before I could prevent the accident he tripped over one of the ropes, then tried to recover himself and again fell over another; while struggling the pegs were wrenched up, and in less than a minute the shed fell with a crash, breaking the poles, and burying the instruments under the wreck. It was no use complaining, and my ignorance of the language prevented any further remonstrance on my part than by violent gesticulation, accompanied with certain words expressed in English, though possessed of a meaning unmistakable to anybody ignorant of the English language. On picking up the fragments of the shed, I found first of all that my mercury barometer was broken into ever so many pieces; the thermometers in the box had fortunately escaped damage. Nothing had happened to the boards, although, of course, they lay disjointed,

\* "Meteorological Observation on the Peak of Teneriffe," 'Quarterly Journ. of the Meteorological Society,' vol. v, 1879, by the Author.

but the four poles were broken. It was fortunate, however, that the break occurred close to their upper ends, so that by cutting them a little shorter, and screwing in afresh the iron pegs which held the boards, the mischief could be repaired. The loss of my barometer, however, I greatly felt. Every care had been taken of this instrument ever since we had left London, and this was certainly about the most unexpected way it could have come to grief. The muleteers, I must own, looked very sorry for the accident.

The last two nights under tent at Guajara were extremely pleasant, as the air had suddenly become a little damper and the temperature risen at night. I obtained at last two good nights' sleep under canvas, which proved a great comfort.

On the 7th of July there was a peculiar hazy state of the atmosphere from the presence of a very fine dust ; it interfered very much with the working of my chemical balance within the tent, and I had to wipe off the knife edges constantly, after which the oscillations of the instrument recovered their freedom. We were also much troubled with flies in our tent, and these proved very inconvenient, provokingly settling on the beam of the balance while I was weighing ; and if one was frightened away, half a dozen others would be alighting on the beam before I could obtain my weight, so that one single weighing was quite a work of time and patience.

On that day we ascended the Guajara Mountain to visit what remained of Mr Piazzzi Smyth's encamp-

ment in 1856. The excursion was very interesting in many respects. We found large quantities of pumice-stone and some beautiful masses of obsidian (volcanic glass), one of them was quite a large boulder. We observed rocks of coarse and friable sandstones holding round pebbles embedded in it. A cliff of this material, about eighty feet high, was worn out at the bottom into hollow and rounded recesses, clearly by the action of a powerful torrent; the present configuration of the land, however, cannot account for any such agency, and it must be concluded that considerable local changes have taken place since that time. We found Mr Smyth's stone walls still standing, but the structure was roofless. The building was divided into six compartments, and a large flat stone just outside supported on three pillars looked like the table, of which we took advantage for our luncheon.

Towards the south, which had been so far concealed from our view, the eye ranged over a hilly country, but nearer to us there were two mountainous offshoots from the Guajara, with a cañon or chasm between them, as if a sudden wrench had occurred through volcanic agency.

Besides obsidian we found some beautiful specimens of fibrous glassy masses of a most delicate structure, varying in size from a pebble to a large stone; they were wonderfully light, and we picked up many of them. I had no box to put them in, and notwithstanding all possible care they became much damaged in our pockets. Mr Piazzi Smyth ascribes to this station an altitude of 8843 feet above the sea.

There is a path over the Guajara Mountain to the south side of the island, used by the natives when carrying cochineal; we saw several of them with cochineal boxes on their heads. The fire we had observed at a little distance on reaching our first camping ground after ascending from Puerto, probably belonged to a party conveying such loads over the mountain. I inquired later whether anybody went over the mountain in winter, and was answered in the negative. The weather on the peak is reported to be too cold in winter to exist there. I do not think, however, that the winter temperature of the peak in the sun above the clouds can be particularly low, on account of the latitude and of the intense solar radiation in such clear atmosphere and at that altitude; indeed, it appears to me that the temperature must be pleasant enough when the sun is out, but I would expect the nights to be excessively cold, and a party benighted in winter, crossing the Cañadas with no other protection against the cold than their cloaks, even supposing they had a fire, might run great risk of perishing from the cold.

On the 8th July my camp was struck, the mules loaded, which was not an easy matter, and we finally got under weigh a little before eight o'clock. It is impossible to convey any idea of the masses of volcanic rocks and huge blocks of lava heaped upon each other, through which our caravan had to thread its way. A kind of path we struck into soon became bad, then all but impracticable. It is about this time that we noticed the

long ranges of beehives to which I have already alluded. The poor mules with their loads were moving on very slowly, picking out their way most carefully amongst the lava *débris*, when down went one of them. A general halt was made, and the beast was unloaded to allow him to recover himself, after which he rose to his feet and the baggage was replaced on his back. A little further on that same animal again fell down amongst the rocks, and the operation of unloading and reloading had to be repeated. The poor beast was so weak and exhausted that he fell a third time. I was then walking in front of him; on hearing a noise I looked round, and saw the mule describe a complete sunset; he lay on his back, struggling with his four legs, but unable to recover himself. It was now obvious that he could not carry his load, and the horse was pressed into service. His owner appeared somewhat reluctant to have him lowered to the level of a mule, and made into a common beast of burden, but he had to submit. Later on this horse also came to grief and fell amongst the lava blocks, without, however, hurting himself seriously.

In spite of all these stoppages, our party after picking its way over lava beds and an interminable labyrinth of masses of volcanic *débris*, arrived at three o'clock in the afternoon at our second station, known as *Alta Vista*, 10,700 feet above the sea. In the last part of the ascent we crossed the white dome-like eminence I had noticed at a distance on our way from Puerto to Guajara. The white appearance was



owing entirely to pumice stone scattered over the spot ; there were some large stones of pumice, but most of it was in powder, and at a distance looked very much like snow.

Alta Vista had already been used as a station by Mr Piazzi Smyth, and we found the walls of his establishment still standing although the roof had entirely disappeared. These walls were made of blocks of lava heaped up on each other, they enclosed four compartments, in one of which I subsequently put up the sun-shed. As soon as we reached this station our mule drivers, who were more thirsty than tired, made an immediate start for water, which was to be found in a remarkable cave at a quarter of an hour's distance higher up towards the terminal cone.

Leaving the mules in camp we moved on, and presently came upon a hole in the lava the size of which I found by direct measurement to be thirteen feet seven inches by seven feet five inches ; this opening was a perforation through the dome of a cave fourteen feet three inches deep at that place. Inside the cave a heap of snow was seen on raised ground, while near it there was clear water over a bed of ice. The cave looked like a huge oven into which the only admittance would be through a hole in the roof.

As soon as we reached the spot one of the mule-drivers prepared to be lowered down into it with a rope, but the Chamonix guide, a tall and particularly powerful man, proposed at once to go down without any kind of assistance. Great surprise was shown by



AITA VISTA, (10700 FEET) ON THE PEAK OF TENERIFFE, THE AUTHOR'S SECOND STATION  
WITH THE REMAINS OF MC PIAZZI SMYTH'S STATION IN 1876 *From a Photograph*



the Spaniards ; he set to work, however, and, hanging by his fingers to the projecting rocks round the hole, contrived to place his foot on an old ladder which had been used formerly, but was now too short to reach the aperture, and was leaning against an adjoining angle of rock below the opening. With the assistance of this ladder he got to the bottom easily enough. We had brought up with us buckets and empty bottles, and these were filled with water and hauled out tied to the end of a rope. Next came the guide's turn, and the rope was thrown down to him to be fastened round his body, but he again declined, and determined to come out unaided. This was indeed a feat of muscular power and mountaineering skill. Having reached the rocks round the hole, he laid hold of them with the ends of his fingers, and then drew up the whole weight of his body through the opening by one great effort, landing his knee on the top.

The ice cavern is at an altitude of 11,044 feet above the sea according to Piazzzi Smyth. As this cave is particularly interesting, I may be allowed to transcribe the notes I took upon one of the many occasions on which I was lowered into it. There are three projections, or horns inside the cave, in a north, east, and south-west direction ; on the floor where the east horn opens into the cave, boulders of lava are seen rounded above, and corresponding with concave depressions exactly over them in the roof, showing that they must have been detached from above, apparently by some blasting power. In the north horn all is dark, its floor

is covered with water. In the cave just below the entrance there is a mass of lava boulders covered with earth, allowing a dry footing when lowered down with the rope. Close by, rocks were observed of an interesting character, as the vault above them was seen to consist of smooth lava, while elsewhere the inside of the cave is either lined with spiculæ or exhibits a rough surface, having clearly originated when the lava cooled. The smooth surface of the vault was about twenty feet by ten; the boulders on the floor of the cave just below had on their upper surface a smooth appearance, corresponding with that of the roof, but their sides were spiculated and rough, showing apparently that these boulders had been detached from the roof of the cave after the lava had solidified. Their fall was probably due to the contraction of the vault on cooling. It appears as if the cave, which was, from a rough estimation, about seventy or eighty feet or perhaps more in its widest part, was originally a bubble of gas in the lava track coming down from the peak; this bubble became distended by the intense heat in the direction where the material was most disposed to yield, and after forming the horns I have alluded to, made its escape above by bursting through. It occurred to me that there might be some analogy between this cave and the empty space which must exist under ground close to the sulfatara at Puzzuoli near Naples, as shown from the hollow sound produced by striking the ground a heavy blow at that place with a large stone. At 5.20

p.m., while outside the cave the temperature of the air was at  $60^{\circ}$ , inside the cave it was  $37.8^{\circ}$ ; therefore, the snow heaped up on the floor of the recess was melting quickly. During our stay at Alta Vista our first occupation every morning was to visit this place for a daily supply of water; I usually went in, being lowered down to the bottom and hauled out after the supply of water had been safely deposited outside. We filled our cask and two buckets, but it was no easy matter to carry the buckets, when full, over the blocks of lava which recalled very forcibly the moraine of a glacier. Long steps had to be taken from one rock to another, and sometimes the distance had to be cleared with a jump, so that it was impossible to avoid spilling a great deal of the valuable contents of the buckets before reaching a path which took us into camp.

The snow in this ice cave is renewed every winter and melts away entirely during the summer. The opening of the cavern faces north, so that the sun never penetrates into it; in winter the snow drifting with the wind is blown down the hole and accumulates in the cave throughout the cold season. Of course, no snow falls on Teneriffe in summer.

Our camp at Alta Vista was situated on a tolerably flat piece of ground intervening between two streams of lava. There were huge blocks of this material in various directions, but we had quite room enough. The tent was pitched close to a large rock, in hopes that we would thus find a friendly shelter from the wind, but



we were much troubled at night with a stiff north-west breeze, sometimes increasing to a gale, and our tent kept shaking as if we were on board ship with the sails flapping.

Our station at Alta Vista faced about east. Behind us masses of lava rose higher and higher until out of sight, and we had no view of the terminal cone. On both sides streams of black lava, at some places smooth, and at others broken up into separate masses, formed a steep declivity, reaching first of all to the Montana Blanca or white dome we had come over on the way to Alta Vista, and then down to the great plateau, where the lava bed exhibited the appearance of a black glacier with jet terraces and dark crevices. Nobody has ever crossed this sea of broken-up lava, which indeed looks quite inaccessible. We had also a distinct view of the mountain boundary of the old crater, and within this wide circus there were visible small mounds with a depression at the top, looking exactly like the craters of miniature volcanoes. Beyond the mountain boundary the hill-slopes might sometimes be seen, but they usually disappeared in the fog. We seldom had any view of the sea on account of the cloud-stratum, but now and then it appeared to us very clear and distinct. Although 10,700 feet above it, there was no difficulty in judging as to whether it was rough or smooth, and I recollect how surprised we were on one occasion to see it very rough when we had no wind at all. In the evening, looking towards the Island

of Gran-Canary, we noticed on several occasions a peculiar shadow over the sea of clouds, which must have been that of the peak, as it recalled its shape, and could be caused by no other object. The beauty of this sea of clouds, which stretched around us in every direction, surpasses anything of the kind that can be described, and recalls the wonderful sceneries so admirably illustrated in Mr Glaisher's book on 'Balloon Ascents.' On the evening of the 11th of July, at 6.40 p.m., I took the following note:— East north-east, as far as the eye can reach, there is a motionless sea of clouds, on which enormous ghost-like, and perfectly still waves, extend beyond the slopes of the lower hills of Teneriffe about 4000 feet below us. In the north-east the waves assumed the form of a gigantic though motionless waterfall, or rather two falls meeting at an angle somewhat like Niagara; there was a smooth surface, simulating water curling over a flat rock, while masses of white foam, like vapour, were visible below, rolling over each other until they seemed to reach the land. Beyond the site of this curious phenomenon the level white sea of cloud became lost far away in the horizon, where it terminated in a pink haze, gradually merging higher and higher in the sky into yellow, green, and blue. Before us, at a little distance, the island of Gran-Canary rises out of the clouds, which break asunder at one spot, displaying a band of real sea. On these clouds a huge, clearly-defined image is projected, which cannot be anything but that of the peak with its culmi-

nating cone. 6.50 p.m.—We have been in the shades of the evening for some little time ; now the hills and rocks in the east are coloured bright red by the setting sun, and the tips of the waves on the sea of clouds glisten with a pink hue. To our right, or southward, the clouds and horizon, and perhaps the sea, are all mixed together in a haze of the most delicate mauve colour, through which white hillocks of mist appear. At 7 p.m., a little to the right of the spectre of the peak, the moon now appears not quite full ; gradually the darkness increases, and nothing is left of the phenomenon but a light pink line extending all over the visible horizon ; it lasts but a minute or two and then fades away. Such views were often seen during my stay at the Alta Vista station, though perhaps not to the same degree of perfection. The sea of clouds, in appearance so homogeneous and motionless, was ever moving in a southerly direction and ceaselessly driving into space above.

The form of the cloud-structure, appearing like a waterfall, found an explanation later from the circumstance that the plateau of Laguna, already referred to, in the north-east part of the island, is comparatively damp, and upward currents of moist warm air are probably formed on that plateau, producing a rarefaction into which the clouds above are precipitated ; they appeared, indeed, from the peak to shoot down upon that very spot.

The shadow of the peak was probably due to the rays of the setting sun and to refracted light after the

sun had actually set. The second coloration of Mont Blanc some time after the sun has disappeared behind the horizon shows that such a kind of refraction actually does take place. There was a narrow and elongated shadow rising from the summit of the image of the peak, and for which I cannot account.

*First ascent to the peak.*—On the 9th of July I made a first ascent to the summit of the peak, which was little more than a walk, as we had only to rise from 10,700 to 12,200 feet, and there was no difficulty whatever to encounter. What instruments I wanted for experimenting with, were packed in a knapsack, which Cupelin shouldered. I took a blanket with me, proposing to use it as a shelter against the sun, and we started at about 7 o'clock with a muleteer. A halt was made at the ice-cave and some water procured, while the cask and two buckets were filled and left on the spot for our return journey. We next climbed over masses of lava, having to balance our bodies carefully as we stepped on the sharp ends of the blocks, many of which were so loose that an immediate leap had to be taken on to the nearest rock. We then had an opportunity of observing that the blocks of lava on receiving a sharp blow gave a metallic ringing sound, very much like that of a bell.

Thus we toiled on, sometimes deep down between two ridges of lava, and sometimes threading our way over a sharp arête. After about an hour of this laborious exercise we came to the foot of the terminal cone.

There is a comparatively flat, desolate, and rocky terrace encircling the base of the cone which was now close to us. Through a fissure in one of these rocks a very hot current of air was issuing, and where the ascent commenced sulphurous vapours were emitted at different places. This cone put me in mind of Vesuvius, but the sand was of a much coarser nature and lighter in colour, and was mixed with a quantity of pumice stone, while we met with many beautiful vitrified masses of needle-shaped silicates. The ascent was rather steeper, I should think, than that of Vesuvius, but instead of lasting about an hour and a half it took me only forty minutes, though I ascended but slowly, making frequent halts. Here we stood on the culminating point of the Peak of Teneriffe, and it was certainly a wonderful place, so little like anything I had seen before either in Switzerland, Corsica, Norway, or in the Rocky Mountains.

We were here on the top of a circular wall of rocks, and had no difficulty on standing on the highest spot. These rocks were much jagged and broken up, but mostly accessible, and I walked round in about thirty-five minutes; they formed the boundary of the culminating crater or cup-shaped depression nearly a mile in circumference, and thirty-five or forty feet deep. The whole crater was of a dazzling whiteness, as the sun was pouring down its burning rays upon it, while at two or three places fumes were emitted. There was no difficulty in exploring the inside of the crater,

and at one spot we observed a real "solfatara," giving out steam and great heat. A considerable quantity of crystallized sulphur was to be seen, either adhering to the rocks or scattered over them like a powder. Those in and around the crater were all of volcanic origin, although not consisting of lava. The floor of the crater was everywhere very hot, but it was impossible to ascertain whether the heat was of a subterranean or solar origin. I collected some of the sulphur from rocks so hot that I could barely scrape it off with the hand.

As regards the view from the summit, the sea of broken lava and the rugged mountain boundary of the old crater were very curious to behold. The cloud stratum was hovering over the sea northward in layers of a lovely white, broken masses of which were detached at places, and appeared as if rolling over each other. There were gaps in the fog through which the sea became visible, though still in a haze; the easterly end of Teneriffe looked like an island in a sea of clouds.

After we had done exploring the crater we moved down about thirty feet below the summit, where I proposed making some experiments, but slight puffs of sulphurous vapours which reached us now and then made it useless to proceed with the work. About noon we had luncheon and drank the water destined to my work, rather rejoicing that the experiment had come to grief, as this was the only water we then had with us. I returned afterwards to the summit to have



one more look at the grand spectacle and take away a few more specimens of sulphur, &c., and then we made a rapid descent; the lava slope was soon passed, and after calling at the ice-cave for our supply of water, we reached camp between two and three o'clock.

I made a second ascent of the peak on the 15th July, my principal object being to determine the amount of water expired from the lungs at the summit. A very delicate chemical balance with weights, a tube containing chloride of calcium, and various other instruments, were packed up for the purpose in a hamper and a knapsack. We left camp at 7.20 a.m., and arrived at the foot of the cone at eight o'clock; the summit of the terminal cone was reached at twenty-six minutes past eight o'clock, so that it had only taken us one hour and six minutes from Alta Vista to climb the 1500 feet.

In order to be sheltered from the wind I selected the deepest part of the crater for my experiments, but there was great difficulty in finding a suitable place, and we had to nestle in turn between two boulders, in a space just large enough for one of us and the necessary apparatus. The balance was set up in the hamper standing on its side with the lid open, while the blanket was thrown over it, and I made my weighings under the blanket much like a photographer engaged in bringing his camera into focus. When using the balance I had to lay flat on the burning sand with the greater part of my body full in the sun, which could not be done without causing some fine mineral particles to fly about, and these falling on the

instrument, and getting in at the points of suspension of the knife edges interfered with the working of the balance, so that the beam had to be constantly wiped. Then great difficulty was experienced in placing the balance in a perfectly level position, and the inquiry was certainly one of time and patience. At last the balance refused to oscillate at all, and I had to pack up for our return trip. We arrived in camp a little after 4 p.m. I shall never forget the trouble of this day's campaign, as everything seemed to unite to oppose the research I was engaged upon. I succeeded, however, in obtaining a few determinations of the amount of water Cupelin and I exhaled in a given time, and it was surprising to observe how much it exceeded that which we expired either at Guajara or at Puerto Orotava, but especially at Puerto.

That same evening there was a charming moonlight. The sea of clouds opposite our station was perfectly smooth, and reflected the white phosphorescent rays of the moon exactly as from a surface of ice ; the illusion, indeed, was perfect, and the view was quite an arctic moonlight scenery, or what it must be. While the light of the moon, reflected from the sea, usually exhibits a wavy appearance and lines of glittering brightness, there was no such phenomenon in the present case, but a soft white light was seen diffusing itself without any glitter. At some places on that apparent sea of ice there were masses heaped up simulating snow, which were moving slowly over the icy surface as if by some magic power.

The 18th of July had been settled upon for the return trip; on that evening the five mules arrived from Puerto a little before six o'clock, having been about eleven hours on the way, and I made the drivers happy with a cup of strong hot coffee. They haltered their horses to blocks of lava in various directions, lighted a large fire, having brought up wood with them (which was a scarcity here), and then sat round it, their faces beaming with pleasure at the sight of the glaring flames. Turning towards me they would call out, "Fuego, señor," and, indeed, nothing pleases them so much as the sight of a bright fire. They then brought out small pieces of raw meat and stuck them on the ends of sticks which they ran into the ground, the meat being brought close to the fire at the proper height, and then turned round till it was roasted. At the same time they threw potatoes into the fire and ate them afterwards. The inhabitants of the island are so fond of fires that if any "fête" or rejoicing should be going on at Teneriffe, bonfires are sure to be plentiful. On one occasion, at Puerto, I counted over a hundred and fifty on the hills in various directions, and there were a great many more, judging from the smoke of those which were concealed from view. While we were at Santa Cruz, waiting for the Marseilles steamer, some feast was held and an enormous bonfire was kindled in one of the public squares, into which all sorts of combustible material were indiscriminately thrown.

Returning to my narrative, we had by this time

become short of good food (what was left of our fresh meat had turned bad), and we had to fall back upon Australian beef, which was boiled into soup with an addition of "extract of beef." Bread had become a very scarce commodity; what little was left was extremely hard, and we had none the last day. The candles having come to an end, we instituted the lamp I have alluded to, and burnt the fat of our bacon, which did not, however, give a very satisfactory light. The mule-drivers, seeing our provisions were running short, most obligingly offered to share with us what they had, and on the day we left we gladly accepted a portion of their bread.

I did not like to leave the peak before making a last series of experiments at the foot of the cone, and after some trouble, I thought I succeeded in arranging that three mules would start the next day with part of the baggage, while two would remain and come down with us. The following morning early, Cupelin came to me with a very long face, and intimated that all the men had determined to go down to Puerto that day, so I went to discuss the matter with them. They alleged that there would be no food for the mules if they remained, and that they must leave. I explained that if three mules started they could be put on short allowance for the return trip and get an extra feed at home, while some of their beans might be left in camp for the other two who would remain. This argument appeared to satisfy the men, and it was finally arranged that my plan would be

carried out. The day was therefore spent in returning to the foot of the terminal cone with the necessary instruments and doing the contemplated work. On that evening a remarkable change took place in the weather ; the air, instead of being bitterly cold after sunset, as it had always been, was calm and warm, the sea being in full view, although under a haze.

On the 20th July we broke up camp, hurried through our packing, and having loaded the two mules made our way down to Puerto. While passing some huge retama bushes, one of the drivers stooped down below one for an instant. I was wondering what he could be about, when I was startled by an outburst of flames and smoke, and an instant afterwards the whole bush, which might have been fifty or eighty feet in circumference, was one mass of flame, rising to fifty or sixty feet high. The burning twigs were carried up in the vortex of the hot current of air, while the sparks played wildly about, and the crackling was such as to recall the sound of the sea-wave retiring on a shingly beach. I looked at the fire, which of course spread to the adjoining bushes, thinking it a thousand pities to destroy such valuable wood. The muleteer, however, did not appear to share in this opinion, as a little further on he proceeded to indulge again his love for conflagration, and set fire to another gigantic retama bush. The destruction caused by these fires is, however, but partial, the smaller branches only are burnt, and most of the wood is left ; this dries up and makes excellent firewood.

The sensation on reaching the fog bank and being in the shade after spending three weeks under the intensely hot sun and in such dry air, was delicious, and although we had never been troubled by the rarefied air of the peak, still the increased atmospheric pressure as we descended was a source of undoubted comfort. Our downward progress through the fog was rapid and pleasant, as we drew in long breaths of the deliciously cool and moist air.

At last Puerto was reached, and we were again welcomed by our friend and host, Mr Turnbull; I am afraid he hardly knew us again, as our clothes were in a state fit only for the wilderness we had just left.

We spent a few days longer at Puerto Oratava, engaged with completing my experiments,\* and then left for Santa Cruz so as to catch a trading steamer bound for Marseilles. I had the pleasure of spending half a day at Laguna with the British Consul, and shall not forget his kind hospitality. While at Laguna I had an opportunity of witnessing the mode of threshing wheat in that country, which is very curious. This is done with small bullock sleighs driven over the wheat as it lays on a flat piece of ground laid out for the purpose. Seven or eight of these sleighs, with one man in each, sitting on a raised seat, are seen moving about in a very circumscribed area. The man is probably smoking his cigarette, and he seems quite unconcerned as to the direction his oxen are taking; indeed, these animals appeared

\* 'Proceedings of the Royal Society,' 1879.



to have it all their own way, and walked about over the straw, sometimes round the area, sometimes across it, without ever coming into collision.

Our return journey to Marseilles lasted fourteen days, as we called at several towns on the coast of Morocco; the voyage was long, though interesting in many respects. There was a famine at the time in Morocco from long-continued drought, and it was especially painful to witness the famine stricken Arabs in the town of Mogador, laying about in the public square, some of them too weak to stand. This place did not impress me at all as a health resort, its hygienic condition appeared to be very bad, and I hardly think an invalid would put up with the uncomfortable houses people live in at Mogador.

I must now conclude with a few remarks on the Island of Teneriffe as a health resort. I fully believe, from my experience of its climate and from the information I have been able to gather, that the island is extremely well adapted for a certain class of consumptive invalids. I should prefer in this respect Teneriffe to Madeira, as the climate of Teneriffe is decidedly drier. Of course Santa Cruz would be too hot for a summer residence, but Laguna, about 2000 feet above the sea, Vilaflor still higher up, and the villa Oratava about 1200 feet, are well situated for summer resorts. The winter may be spent at the seaside at Santa Cruz.

*Climate of Teneriffe.*—The Island of Teneriffe is situated in north latitude  $28^{\circ} 20'$ , at 115 miles from

the nearest African coast; the high winter temperature of the sea around it gives the summer and winter a uniform character. I ascertained the temperature of the sea, at the surface, in August (1878) to be  $73.8^{\circ}$  at Santa Cruz;  $71.8^{\circ}$  off Mazagan, Morocco coast, latitude  $31.40^{\circ}$ ;  $70^{\circ}$  off Casa Blanca, Morocco; and  $63.8^{\circ}$  off the coast near Tangiers, giving a difference of  $10^{\circ}$  for the temperature of the surface of the sea between the latitude of Tangiers and that of Teneriffe. The enormous amount of vapour arising from this warm sea-water forms into a bank of clouds hovering over the sea and wafted southward.

The temperature of the Island of Teneriffe is prevented from rising very high, not only from the moisture which accompanies the trade wind, but also and mainly by the layer of clouds keeping the lower part of the island in the shade during the greater part of the year. These clouds never descend low in summer, and, I understand, do not throughout that season reach the "Villa Orotava," 1200 feet above the sea. The altitude of this town renders it often quite cool after sunset in summer, so much so that I felt uncomfortable there on a July evening in the light clothes I wore at Puerto. Unless the clouds should disperse, which they do occasionally when the trade wind subsides, the Villa Orotava cannot be considered as a hot station in summer, and is very pleasant to inhabit.

The following mean temperatures for Puerto Orotava do not apply to towns some altitude above the sea. I

have no records of temperature for the "Villa Orotava," but should conclude, from my experience of the Mediterranean coast, that a mean difference of  $5^{\circ}$  or  $6^{\circ}$  lower for the villa in summer would be near the truth. The subjoined readings are from Mr Gabriel de Belcastel's work on the Canary Islands, and from observations made at Puerto by Mr Honegger, a Swiss gentlemen, who very kindly handed me his figures. His thermometer was placed about six feet above the ground, was well sheltered from the sun, and fully exposed to the north; the readings were made at 7 a.m., 2 p.m. and 9 p.m. It is remarkable how closely the two series of observations agree; Puerto is on the north-east side of Teneriffe. I append a table of the monthly mean temperature at Funchal Madeira, to compare with that of Puerto; Funchal is on the south side of the island.

*Mean temperature on the Island of Teneriffe.*

	Teneriffe (sea side, N.E.).		Madeira (sea side, S.)	
	De Belcastel's.	Honegger's.		
January .....	62·2°	..... 61·2°	.....	61·9°
February ...	62·1	..... 61·9	.....	62·7
March .....	64·2	..... 63·7	.....	64·0
April .....	64·6	..... 65·5	.....	67·1
May.....	69·4	..... 69·1	.....	68·4
June .....	73·1	..... 72·0	.....	68·2
July .....	76·1	..... 74·5	.....	70·1
August .....	73·2	..... 76·6	.....	70·9
September ...	71·8	..... 73·0	.....	70·9
October .....	69·3	..... 70·5	.....	68·7
November ...	68·4	..... 68·0	.....	65·0
December ...	66·7	..... 63·5	.....	62·6
Mean .....	68·5	..... 68·3	.....	66·7

According to Honegger's statements, the approximate difference between the mean day and night temperature at Puerto Orotava varies in summer between  $7^{\circ}$  and  $9^{\circ}$  Fahr., and in winter between  $11^{\circ}$  and  $14^{\circ}$  Fahr.

The mean winter temperature for Puerto, Teneriffe, is  $64.7^{\circ}$ , and for Madeira  $63.9^{\circ}$ , which is not above what may be called a comfortable heat for either place, although considerably higher than that of the Riviera, reckoned at  $50.8^{\circ}$  (Cannes).

The mean summer temperature at Puerto, Teneriffe, is  $72.3^{\circ}$  ( $69.5^{\circ}$  at Madeira), but I should think that of the "Villa or Town of Orotava" may be safely taken at  $67^{\circ}$ , or very near to that figure, which would be lower than Funchal in the Island of Madeira. I made the acquaintance of an English gentleman who was then residing at the "Villa" for the sake of his health, and spoke well of the place; he had a horse and enjoyed very much his rides over the island. By living near the sea in winter and on the hills in summer, very nearly the same temperature will be experienced in both seasons, and a very fair amount of comfort may be obtained, although the accommodation is hardly so good as at Madeira. The want of an English hotel at Santa Cruz is a decided drawback.

One of the great charm of these islands is the absence of radiation at night. While on the Riviera and in Egypt a sudden fall of temperature occurs at sunset, which is fraught with danger to invalids, there is no such chilly feeling to be dreaded at Teneriffe. At sunset

the air feels just pleasantly cool, and inviting for a stroll out of doors, but not the slightest sensation of discomfort is experienced.

The relative humidity at Teneriffe, from a number of observations I made at "Puerto" on the 26th, 27th, and 29th of July, yielded daily means of 59·9 per cent., 63·2 per cent., 68·8 per cent., the mean for the three days being 63·3 per cent. These figures give, I believe, a very fair idea of the degree of relative humidity for the summer in the daytime, as meteorological changes are few and do not last long on that island. The mean atmospheric moisture in summer at Madeira (Funchal) is certainly higher, especially in June, when the humidity often approaches saturation point (Grabham).

The rainfall in Teneriffe, according to Mr Honegger's observations, was, for the year 1875, 13·5 English inches, and for 1876, 15·9 inches. His records for 1877 range only from January to April inclusively, amounting to 7·1 inches during that period. March, April, May, June, July, and August are the driest months, while the rainfall is distributed irregularly throughout the other months. Dr Grabham estimates the Madeira rainfall at twenty-nine inches, so that apparently less rain falls at Teneriffe than at Madeira. It is also somewhat remarkable that June and July at Funchal should seem to exhibit a high relative humidity, while at Teneriffe the air is comparatively dry.

The wind at Teneriffe is very regular, much more

so than at Madeira, and blows most of the year from the north-east. In August there is a good deal of calm weather, when the trade-wind clouds disperse and the temperature rises considerably, especially at the seaside.

The climate on the peak above the clouds is of a thoroughly different kind, and hardly of a nature to interest anybody wishing to visit the island for health or pleasure, as nobody would think of making a stay high up on the mountain except with a particular object in view, as was my case. The heat in the day time was very great, and at night the cold was acute. On the 3rd July, at 5 a.m., or before sunrise, I placed a thermometer on the sand and found it to register  $28.8^{\circ}$ . It was on that same morning that I had found the water frozen in a plate put out on the hot sand the evening before, and the morning previous to that day Cupelin had found water frozen in bottles left under the shed. On the 1st of July the thermometer on the sand at 4.5 a.m. registered  $28^{\circ}$ , and under the screen  $35^{\circ}$ . July 1st: the temperature on the sand at 5.15 a.m.  $26.5^{\circ}$ , and under the screen  $36.7^{\circ}$ . The early morning of the 6th July was the coldest I experienced, yet at noon the temperature was the highest I met with at Teneriffe; on that occasion the reading on the sand was  $23^{\circ}$  before sunrise, and  $83^{\circ}$  under the screen at noon. Assuming the temperature to have been  $30^{\circ}$  under the screen before sunrise, this would give a range of  $53^{\circ}$ , the air that day felt oppressively hot. At 3.30 p.m. a small cloud was visible about due north, quite a phenomenon in the



spotless sky ; it looked like a huge balloon in mid-air some distance from the peak ; in the course of a few minutes it had vanished. There was much haze in the atmosphere on that day, clearly seen in the rays of the setting sun ; the night following was again very cold. On the 9th of July the haze or atmospheric dust was again observed.

The next point of interest was the low degree of atmospheric humidity. On testing the humidity of the air with dry- and wet-bulb thermometers, the extreme difference of reading between the two amounted to no less than  $30\cdot5^{\circ}$ , which occurred at noon on the 2nd of July. This is a degree of atmospheric dryness perfectly unknown in England, where a difference of  $10^{\circ}$  applies to very dry weather. The mean of twenty-five observations made at the Guajara station yielded a difference of  $22\cdot2^{\circ}$  between the readings of the dry- and wet-bulb thermometers. The chilly sensation at night was greatly increased by the dryness of the air promoting evaporation from the skin and lungs, and thereby producing additional cold.

The clearness of the air at night and brightness of the stars was something quite surprising, and as an astronomical station, the Peak of Teneriffe certainly offers every possible advantage. Mr Piazzi Smyth's interesting astronomical observations quite bear out this remark.

The winds on the peak are interesting, as showing that at my Guajara station (7090 feet) there was still a tendency to the north-east trade wind, although a

southerly gale blew on the 30th of June. On the other hand, at Alta Vista (10,700 feet) westerly winds prevailed, with an occasional northern tendency and a rather greater amount of atmospheric moisture. There was consequently every appearance that the upper return south-west current was beginning to be felt at that altitude, bringing back moisture from between the tropics. The wind was not yet, however, south-west, but its westerly tendency was certainly apparent.

Passing allusions have been made to the medical resources of Teneriffe, but this island it is not yet so well known as a health resort as that of Madeira, and it is impossible to write on this subject, without at least a local experience of many months. I have made inquiry, however, as to the medical aspect of Teneriffe from a very reliable source, and thanks to the kindness of Dr Victor Perez, who has resided and practised for a long time on that island, I am able, in great measure, to offer the desired information.

This gentleman writes to me as follows :

“The mild uniform temperature and slightly moist atmosphere of our coast is productive of the state of anæmia met with in hot countries, while it also exerts an influence on the course of disease. It is, indeed, very easy to distinguish at first sight between inhabitants of the coast and those who live in the higher parts of the island. Even at an altitude of 500 metres (1640 feet) the difference is very marked. Judging from the increased circulation and improved coloration of the skin, from the activity of the functions, and the

better state of health in general, those who reside on the higher stations appear as if living at a distance of  $20^{\circ}$  of latitude farther north."

"Diseases are also more acute in their character and run a more rapid course on the hills than at the seaside. Scrofula and phthisis are much more frequent at Santa Cruz (seaside) than Laguna. At Santa Cruz the mortality from phthisis is about 3 per 1000, and at Laguna it only amounts to 0.65 per 1000."

"If this influence of a difference of altitude be considered between two spots situated in the *north* of the island, such as the Villa Orotava and Puerto, it will not be found so great as it is on the *south* side, although still obvious. At Puerto Orotava, on the seaside the mortality from phthisis is about 1.50 per 1000; higher up at the Villa Orotava it does not reach 1 per 1000. The difference of altitude is also less on the Oratava side, and moreover the hygienic conditions are a little better there (on the north side) than at Santa Cruz; they are, however, everywhere bad." He continues by remarking that with reference to the climate in general, I may have judged of its mildness. There are beautiful stations with reference to scenery, for every season. Puerto Orotava is suitable for the winter until the month of May. Vilaflor, a town considerably above the level of the sea and close to the upper level of the trade-wind clouds, would be conveniently situated as a summer station. Laguna; Tacoronte, between one and two thousand feet high, and other places half way up in

the north, would answer the purpose from September till November."

The following is an abstract of another letter from this same gentleman, which, his son, a graduate of the London College of Surgeons, was so kind as to send me:—In Teneriffe acute diseases appear to be milder, and to run a less rapid course than they do in Europe. Intestinal affections, mainly diarrhoea, predominate; they are not serious though very obstinate, which Dr Perez attributes to the nature of the food, viz. unripe fruit, salt fish in bad condition, and too many potatoes. The kind of food and uniformity of temperature produce, he believes, the many cases of chloro-anæmia observed here; while the bad ventilation of rooms, especially at Santa Cruz, also predisposes to a similar state of ill-health.

Wounds or surgical operations on the island, even before the adoption of Lister's antiseptic method of treatment, were hardly ever followed by erysipelas or purulent infection. Puerperal fever also very rarely occurs. Intermittent fever (ague), although very seldom, of a pernicious form, became common after the cacti had replaced the vineyards. Skin diseases are very common.

This account is given by a well-informed and intelligent physician, who has practised many years at Teneriffe, and is thoroughly well acquainted with the medical aspect of the island. It appears as connecting to some extent the climate of Teneriffe with that of Upper Egypt. The air is not nearly of such

an antiseptic character as in Upper Egypt, but it seems to exhibit that property to a certain extent, especially in places distant from plantations of cacti, and as such would be available for the treatment of phthisis.

I am inclined to believe that Teneriffe will eventually become a favourite station for consumptive invalids; and even at present those who can put up with fair, though perhaps not luxurious accommodation, may find acceptable quarters at Puerto Orotava and the Villa Orotava, while there are pretty good houses to be had at Laguna. I do not think the English would quite like the Spanish hotel accommodation at Santa Cruz, but I believe comfortable houses can be had in the town; it will be necessary, however, to put up with Spanish cooking and Spanish attendance.

## CHAPTER X

## ON HEALTH RESORTS UNDER THEIR MEDICAL ASPECT

I HAVE previously alluded to the medical character of some of the stations with which we are concerned, but am now anxious to take a more general view of the subject. I propose, moreover, in this chapter to inquire into the treatment of phthisis by mountain climate, and offer what I consider the probable explanation of the beneficial influence of altitude in consumption, an influence now generally acknowledged.

It may be remembered that when describing the health resorts of the Riviera, I have barely alluded to their medical aspect; my object in doing so was to avoid repetitions, as the medical considerations belonging to any one of these stations is also calculated, in a great measure, to concern them all. I am even afraid that the remarks I shall have to make on the medical resources of the Riviera, must be, to a certain extent, a repetition of those applying to Madeira and the Island of Teneriffe.

People wintering on the Mediterranean Coast for the benefit of their health, do so either from excessive susceptibility to cold, damp, and fog, or for the purpose of checking some chronic affection usually worse



in winter than in summer; while others visit these health resorts with the object of arresting threatening signs of serious pulmonary disease.

It is well known, in a general way, that the mortality in England from diseases of the lungs is greater in winter than it is in summer. A lecture delivered at the Royal Institution, March 25th, 1881, on "weather and health of London," by Mr Alexander Buchan,\* gives much useful and interesting information on that subject. The comparative mortality in London is shown by this gentleman for every month in the year, by means of tracings or curves. It will be observed from a glance at these curves that there is a great preponderance of deaths during the coldest months of the year. This increased mortality must be assigned, in the first place, to diseases of the respiratory organs, although not to phthisis. About one in eight of all deaths that occur are caused by bronchitis, and one in sixteen by pneumonia, so that nearly one fifth of the deaths is due to these two diseases. Mr Buchan's researches appear to warrant the conclusion that the greatest mortality from pulmonary disease (I presume phthisis excepted) occurs when the temperature is between 32° and 40° Fahr. In New York, where the winter temperature is 10° lower than in London, the mortality from affections of the respiratory organs, curiously enough, forms but a small fraction of the whole number of deaths. The four curves for asthma, bronchitis, pneumonia and laryngitis, in

\* 'Nature,' June 23rd, 1881.

London, are substantially the same, each having its maximum in the cold months and its minimum in the warm months. Asthma shows the greatest sensitiveness to weather, and pneumonia the least. These tracings all exhibit in different degrees a double-ridged maximum, the one occurring in the middle of January, when the temperature falls to the annual minimum, the other in March. Asthma and bronchitis decidedly reach the maximum when the weather is coldest, whereas laryngitis has its maximum in March.

But in addition to the influence of temperature, Mr Buchan's researches point out clearly the deleterious influence of fog; "and in cases where the fog is dense and persistent, the mortality from diseases of the respiratory organs becomes truly appalling, as happened in London early in 1880, when the mortality was nearly doubled. An examination of the fogs of London shows that they do not commence till the autumnal equinox; and it is at this epoch that asthma, by far the most sensitive of all diseases to fog, starts from its annual minimum; and in the end of November and beginning of December, when fogs become most frequent, the curves for asthma and bronchitis shoot up with startling suddenness."

Phthisis, observes this author, is one of the two most fatal scourges of our British climate, causing one out of every eight deaths. By referring to the curves, the *maximum* for consumption will be found in *March* and *April*, and its *minimum* in *September* and *October*, the *mean* mortality occurring at the coldest time of

the year. The deflections of this tracing are, however, but small.

Let us now inquire, for what reason, while the winter predisposes to bronchitis and, as a rule, to diseases of an inflammatory nature, the spring season proves more fatal to phthisis. This I account for in the following way:—During the winter the body has to burn more fuel to preserve its temperature than in summer; it is a fact that more carbon is consumed or more carbonic acid expired throughout the cold than the warm season. Invalids, as well as people in good health, are subject to that same law, although, of course, the former being kept indoors and in warm rooms will burn less on that account. This demand for increased oxidation stimulates necessarily the activity of the circulation of the blood and of the nutrition of tissues, while the vitality of these tissues being somewhat depressed by the cold, the balance between circulation and the power of nutrition is no longer perfectly maintained, a circumstance which predisposes to, and may be productive of, inflammation.

I must be allowed to refer the reader to a very interesting lecture on the Pathology of Inflammation, delivered recently at the Royal College of Physicians by Professor Burdon Sanderson,\* in which he explains that inflammation is actually owing to the circulation of blood through tissue which has partly lost its vitality. Such simple illustrations as burns, chil-

\* 'Brit. Med. Journ,' March 25th, 1882.

blains, and frostbites, will appear to show that this view of a phenomenon which has so long attracted the attention of pathologists, is the true one. The fatal effects of bronchitis and pneumonia on aged people admit of a similar explanation.

In regard to phthisis, it is a singular fact that its progress is most active when the vitality of the tissues is at its maximum; it is, indeed, during the period of youth, or between fifteen and twenty-five years of age, that phthisis runs the most rapid course, and is especially dangerous to life. At a later age this disease becomes less acute or dangerous, while *inflammatory* affections of the lungs are more and more fatal. It is also extremely remarkable that certain physical conditions, such as altitude, known to predispose to inflammation, should, in many, perhaps in most cases, have no baneful effects on the progress of consumption, but on the contrary often exert a salutary influence. If to these facts we add the result of Mr Buchan's inquiries—that phthisis is especially fatal in March and April, while bronchitis shows the greatest mortality in midwinter, we must come to the conclusion that there is a difference between phthisis and pulmonary affections of a strictly inflammatory nature, and that the explanation of the original cause of inflammation cannot apply to phthisis. Dr Koch's remarkable discovery of the presence of infinitely small organised objects or *bacilli* in tubercular matter, and the expectoration of persons suffering from tubercle, appears to give phthisis a character of a special nature, and to account for it

better than any other cause to which it may be ascribed; but there is a great deal more to be known on that subject. Consumption, however, may be accompanied by inflammatory symptoms, such as acute bronchial irritation, or pulmonary congestion with signs of pneumonia, a high temperature of the body and hectic fever with its regular daily periodical accessions, and these symptoms must always be looked upon as serious complications in the progress of the disease.

There are numbers of invalids wintering regularly at Hyères, Cannes, Nice, and Mentone, who would feel miserable during the cold season in England; and the warm winter climate of the Riviera and other similar resorts has undoubtedly kept many persons with affected lungs in a comparatively good state of health, who would have died in England. They make a point to leave for their winter home before the cold weather and fogs set in north of the Channel, and may be strong enough to undertake certain regular pursuits throughout that season. Such persons are extremely careful of their health while abroad, are never out at sunset or in wet weather, avoid draughts, take care not to become overheated, and carry a parasol. They avoid hot and crowded rooms, eat what they know to agree with them best; in short, having studied their cases thoroughly, they live precisely the kind of existence their health requires.

A considerable proportion of the southern visitors migrate to the Mediterranean shores to avoid attacks

of bronchitis or asthma. Young people with a family predisposition to consumption, ladies fatigued by the London season, persons suffering from chronic rheumatism whose pains and stiffness of limbs are invariably increased by cold; elderly people with bladder affections, other invalids undergoing general wasting and gradually losing strength from disease of the kidneys, people with weak hearts, who are utterly incapable of exerting themselves in cold weather, scrofulous children, and persons recovering from some long debilitating illness; all these sufferers will do well to winter in one of the health resorts of the Riviera, there to find relief, strength, and enjoyment.

It will be asked, which are the best places to go to for bronchitis and asthma? If the affections be very acute or attended with urgent symptoms, especially of an inflammatory nature, and accompanied by loss of sleep and nervous irritability, I should recommend Hyères, Madeira, or the Canary Islands, while Pau appears to agree very well with some cases of bronchitis. Dr Grabham, in his book on 'Madeira,' observes with respect to bronchitis, "Patients thus suffering may be confident of relief or complete exemption during the winter in this climate," and further, "Patients suffering from asthma, who have come under my notice, have in general derived benefit." Should the bronchitis be more chronic in its character, with no fever and apparently resulting from a low and weakened state of the constitution, then Cannes or Nice would be preferable, especially in their hilly



districts. When asthma results from an inflammatory state of the pulmonary organs, elevation above the sea, and exposure to wind and cold should be carefully avoided; but if of a nervous character, or apparently unconnected with any marked bronchial irritation, then a rather bracing climate with some slight elevation above the sea may be more likely to answer. It is very difficult, however, to lay down rules as to the selection of the best climate for asthma.

Chronic bronchitis of a comparatively mild type is usually soon relieved on the Riviera, and a fresh cold is seldom taken, although an attack of coryza, commonly known as a cold in the head, is not unfrequent; but while in England the nasal irritation often makes its way to the throat and bronchial tubes and ends in bronchitis, it is not so on the health resorts of the Mediterranean coast. Some inveterate cases of bronchitis, however, take time to cure on the Riviera, but they are quite exceptional.

I have seen many patients whose object in wintering in the south was the cure of chronic sore throat, most of them being clergymen. These cases in general soon begin to improve, but they require a moist climate, and, I am led to conclude, are more likely to do well in the comparatively damper months of March and April, than in the earlier and drier parts of the season. What, however, on the Riviera benefits most of all clergymen is the rest they experience from their laborious duties; and they should recollect, when in the south for the sake of health, that they suffer mainly from an excessive

use of their voice, and should abstain from long and earnest conversation and from all professional duties.

It is a well-known fact at Cannes that, after a succession of fine dry days, there is an increase in the number of cases of sore throat, and that prescriptions for gargles and throat lozenges become very common at the chemists at that time. This is probably due partly to the very fine dust floating in the air in dry weather, and partly to an excessive evaporation of moisture from the mucous membrane of the throat owing to the dryness of the atmosphere. This evaporation increases the secretion of mucus and thereby promotes the flow of blood to the part, predisposing to congestion. I do not think one place on the Riviera is much better fitted than another for people suffering from chronic sore throat; the main point will be to select a residence in a spot well sheltered from the wind and away from a dusty high road if possible. I should also recommend the more bracing climate to be found some little height above the sea.

Dr Frank, whose opinion on the medical resources of Cannes derives much weight from long experience and careful observation, informs me he has satisfied himself that in cases of diabetes, rheumatism, affections of the heart, and diseases of the kidneys, the climate of Cannes may prove of great value.

The treatment of consumption in southern climates next claims our consideration. We shall set aside at once all cases in the last stage of the disease; and those patients whose days are numbered should

never think of coming south as a last resource. Such means will be of no use to them at all, and they had much better remain at home. Neither should young people labouring under the rapidly progressive form of tubercular phthisis think of resorting to the south to arrest the course of the disease, as they will be disappointed. Again, patients with pulmonary consolidation and perhaps incipient softening with febrile symptoms after an attack of pneumonia should not expect much from the climate of the Mediterranean coast. They may possibly, however, prolong their existence by some months or perhaps for a year or two by the change.

Those cases of consumption that do best on the Riviera are either in an early stage with no inflammatory or febrile symptoms, or in the third stage with pulmonary cavities although in a fair general state of health. Young people are less likely to benefit than those of a mature age; it is, indeed, an invariable rule with phthisis that age has a marked influence on the progress of the disease. Dr Pollock, in his valuable work on the 'Elements of Prognosis in Consumption,' remarks that the most acute manifestations of phthisis are found during the years when the frame is being built up and completed; while it is in advanced life that the slowest variety of the disease is often seen. Brinton considers that at forty years of age half the danger from phthisis is over, and at fifty, three fourths of the danger in males, and three fifths in females. Christison gives the number of deaths from phthisis

in persons selected for insurance in the Scottish Widows' Office, at 40 per cent. between thirty and forty, and 22 per cent. between forty and fifty years of age (Pollock). We must, therefore, not be surprised if in the southern stations young people are slower than others in benefiting from the climate. Moreover, it should be recollected that hereditary influence tells in the mild climate of the south as it does in the north. Indeed, there is nothing in a southern climate of a nature to act as a direct obstacle to the course of phthisis, nothing, for instance, like such medicines as quinine which is pretty sure to stop an attack of ague; but it certainly has a tendency to modify the progress of the disease by placing patients under much better hygienic conditions than they meet with at home, and thereby stimulating the healthy state of nutrition of the tissues.

Dr Henry Bennet remarks with reference to children, as to the benefit to be obtained from an improved state of hygiene under the Mediterranean sky: "To weak, sickly children the daily sunshine and out-of-door life are inestimable. Each winter I see many delicate children rally in a most marvellous and gratifying manner. Instead of suffering from catarrhal affections, as is so often the case at home, they seem to enjoy a happy immunity from these ailments. Constantly out of doors in the sunshine they soon become ravenous for food, sleep well, and get fat and rosy. It is the very climate for strumous children, who generally lose ground during our long northern winters.

Climate alone, however, must not be trusted ; good food, plenty of air day and night, and judicious medical treatment, if required, are essential.”

Dr Thaon, in an interesting paper he communicated to the International Medical Congress at Geneva, in 1877,\* considered, from his experience at Nice, that one of the great advantages of the southern climate is its apparent power of checking to some extent the most serious complications of phthisis—hæmoptysis, laryngeal affections, and diarrhœa. He states that of 131 patients from whom he could obtain reliable information, ninety-one had suffered from hæmoptysis before coming to Nice, but after several winters spent at that station, spitting of blood was only noted twenty-seven times on the 131 patients under observation.

With respect to laryngeal disease and diarrhœa, Dr Thaon makes the following remarks :

In ten cases of laryngeal catarrh seven improved, one remained stationary, and two became worse.

In six cases of ulcerated laryngitis three were cured, one remained stationary, and two became worse. I wish I could confirm, from my own experience, so satisfactory an account of this complication of phthisis. He does not think, of course, that climate can be of any use towards checking the inveterate kind of diarrhœa known as one of the final symptoms of consumption, but the “inter-current” diarrhœa, a frequent symptom in the course

\* ‘Comptes Rendus et Mémoires,’ par Messrs Prevost, Reverdin, Picot, and d’Espine.

of the affection, appears to be controlled or arrested. Thus, in thirty-two cases of intercurrent diarrhœa he records twelve cured and ten improved.

It should not be forgotten that the accession of warm weather in April, on the Riviera, is fraught with danger to consumptive invalids liable to pulmonary hæmorrhage, and they should make a point to leave for a cooler climate by the 15th of that month at latest.

The sanitary condition of the Riviera varies from year to year in its different stations. I have known, at Cannes, an epidemic of smallpox, another of measles, with scattered instances of scarlatina and typhoid fever, and have attended cases of diphtheria at Nice. I can remember a certain number of children with whooping-cough; and when such an epidemic breaks out in an hotel, it is very difficult to prevent it from spreading to most of the children under that roof. A severe attack of gout may commence at Cannes, and erysipelas is not uncommon. Typhoid fever, however, is mostly met with in the hospitals; smallpox chiefly attacks the native inhabitants, most of whom, I believe, have not been vaccinated, while scarlatina is comparatively a very mild affection. Such an epidemic of typhoid fever as happened last winter at Cannes is quite exceptional.

The Islands of Madeira and Teneriffe exhibit in the highest degree a warm and equable temperature, the hilly nature of the country admitting of some degree of altitude for a residence, and, on that account, affording the means of escaping the irritating in-



fluence of the sea, while the pure and light air will be an additional advantage.

If the Island of Teneriffe was as well known as Madeira, and were it not for the reluctance of the inhabitants to receive invalids in their hotels, especially those who suffer from phthisis, I believe it would attract a much greater share of attention than it actually does; being, moreover, out of the line of stations of the Cape mail steamers, Teneriffe has been in a measure undeservedly ignored.

The great advantage of Teneriffe is the dryness of its atmosphere, in addition to the absence of cold from radiation at night, and a hilly country allowing of a residence at some height above the sea, so that dryness of the atmosphere, warmth, equability of temperature, and absence of the direct irritating influence of the sea, are united on that island.

The result of my observations at Teneriffe, after a stay of over two months, and making a careful inquiry into its climate, is that it may prove very useful as a permanent health resort for several years in cases of phthisis.

I should be inclined to consider that consumptive invalids most likely to do well at Madeira and Teneriffe, are those exhibiting inflammatory symptoms, and this from the following reasons:—Dr Grabham, in his book on the ‘Climate and Resources of Madeira,’ observes: “I would especially remark the notable modifications in all inflammatory diseases and complications, the mildness of the eruptive fevers, the

infrequency of hectic in consumption, and the general exemption of the people from the varieties of acute and chronic rheumatism." The natives are but little subject to inflammatory diseases. Dr Grabham observes that they suffer mostly from influenza, whooping-cough, diarrhœa, dysentery, and cholera. When his book was written in 1870, Madeira had only, however, been visited by cholera in 1856.

Diarrhœa, it is true, may be called inflammatory, but in the present instance there is an obvious cause for this affection independent of climate, as, according to Dr Grabham, it may be ascribed in a great measure to unwholesome water and the quality of the food. He observes that the infant mortality from diarrhœa is very great among the poor. With the English, this complaint is not uncommon during the first few days' spent at Madeira, but a few precautions, a cautious and rather restricted diet, and avoiding exposure to the sun, will generally give all due protection. Fevers at Madeira, though by no means frequent, are almost entirely of a typhoid nature. However, during a residence of six years at Madeira, Dr Grabham had only known of three fatal cases of the kind. Pneumonia of a low asthenic form is very common and destructive amongst labouring people. "Pulmonary tubercular disease is comparatively seldom seen in the upper classes of the Portuguese, and the general aspect of the population gives no evidence of its presence; but amongst the poor,

in all districts, consumption is not uncommon, and the women who work at embroidery are perhaps pre-eminently liable to its most severe and intractable varieties."

An indirect evidence of the suitability of Madeira and Teneriffe to cases of phthisis of an inflammatory nature results from medical observation in high Alpine districts. Inflammatory diseases are more common among the inhabitants of the mountains than those of the plains, and Dr Lombard remarks that bronchitis, asthma, emphysema, pneumonia, pleuro-pneumonia, and pleurisy are among the most frequent affections met with in Alpine towns and villages. At Chamonix about one fifth of the death-rate is said to be owing to pneumonia.

Rheumatic affections are very common among those who live on mountains in the northern latitudes, although nearly unknown, according to Dr Tschudi, on the high plateaus of Peru. The stomach is not unlikely to suffer after a prolonged stay above 6000 or 7000 feet, and the monks of the Great St. Bernard complained much to me of gastric symptoms.

Dr Ulschly, of Gessenay, considers pulmonary affections of an inflammatory nature as foremost in the mountainous district in which he practises; he has even observed that the frequency of inflammatory diseases of the lungs is in direct relation with altitude.\*

Indirectly, therefore, if inflammatory affections of

\* 'Les Climats de Montagne considérés au point de vue Medical.'  
Par le Dr H. C. Lombard.

the lungs are found to prevail in cold and high districts of the Alps, it may be inferred that comparatively low and warm southern stations, such as those of Madeira and Teneriffe, will have a tendency to check an excited state of the circulation, local congestions, and an increased temperature of the body.

I am afraid I shall be found to express a very bold opinion by saying that I believe the Riviera, Italy and Sicily, Egypt and Algeria, exercise within certain limits a similar kind of influence on the progress of consumption, and that a person who has done well on the Riviera, for example, would probably have been as fortunate at any of the other stations; while, on the other hand, should one of these health resorts have failed to agree, no other would have been likely to answer very much better. I am perfectly aware that there are invalids who, after trying one winter at Algiers, for example, and deriving no benefit from its climate, would settle down at Mentone, and do much better there; still a few instances of this kind are no objection to my view, as a person may fall on a particularly bad winter at some place, and be the worse for it, while he would have benefited had the season been finer.

There must be, however, shades of differences more or less marked between the various health resorts in question which are important to consider in a medical point of view. The best and most reliable information we have of the comparative merits of the climate



This table yields the important result that, omitting the patients who have taken sea voyages, there is no very great difference between the various stations I have described under the name of "southern health resorts" as to their usefulness towards the treatment of consumption, although it should not be forgotten that a careful selection has been made in each case. As a rule, however, the drier the atmosphere the better they are suited in that respect. In no case should a station near the Mediterranean coast exceed in altitude from 500 to 1000 feet because of the risk of cold and foggy weather and sudden changes of temperature; on the Riviera snow falls occasionally in winter about 1500 feet above the sea.

*Sea voyages.*—It is very difficult, indeed, to express an opinion as to the benefit to be derived by consumptive patients from a long sea voyage. According to Dr Williams' experience, this means may prove very useful; unfortunately it is only available in a comparatively limited number of cases. ✓

Dr Pollock observes :\* "The moral effects of change and the difference in the quality and freshness of the respired air, especially after confinement to the house, are often felt to be powerfully remedial, and the languor, mental and bodily, the want of appetite, the restlessness which prevents sleep, are frequently relieved within a few days of the removal of a patient. Best of all is a long sea voyage, the daily passage through fresh air ensuring its constant change without

\* 'Elements of Prognosis in Consumption.'



fatigue, the stimulation of appetite which soon occurs, the rest of the body without complete inactivity, the novel events of a sea life, invigorate and restore the patients day by day."

Those, however, who have the experience of long sea voyages must be fully aware that they are not unattended with serious drawbacks; the monotony of the existence on board ship, the closeness of the cabins, sea-sickness, and many other circumstances inseparable from sea-life must be taken into account, especially when the object is to benefit health.

*Influence of altitude on consumption.*—It is now generally acknowledged that consumption is rare amongst the inhabitants of Alpine districts at altitudes of three or four thousand feet above the sea, especially people of the agricultural class, while it is met with but quite exceptionally two or three thousand feet higher. This peculiar influence of mountain climate has been established from observations carefully recorded, and extensive statistical researches. Dr Lombard, whose admirable work on 'Climatology' I have frequently referred to, has given great attention to the effects of altitude on disease, and his book on 'Mountain Climate in a Medical Point of View' fully deserves careful perusal by anybody interested in the subject. He published an important paper in the year 1871, entitled "De l'immunité Phthisique," showing that at an altitude of from 1000 to 1200 mètres (from 3280 to 3936 feet), according to the district, cases of phthisis become rare and quite exceptional; and these state-

ments have been confirmed by many medical practitioners residing in Alpine districts.

Dr Hermann Weber, in an important paper published in 1869,\* remarks that : " The elevation necessary for producing a certain degree of immunity from phthisis varies considerably in different latitudes, and appears to become lower in proportion as we proceed from the equator towards the poles. Thus, in the tropical zone it may be regarded at above 8500 or 9500 feet, while in the temperate zone it is considerably lower."

It has been argued that because cases of consumption are rare amongst the inhabitants of mountain districts at certain altitudes, hence, on mountain stations, at the height known to impart immunity against phthisis, consumptive invalids will enjoy the best possible chance of recovery. Whether such an argument be right or wrong, there is no doubt but that altitude above the sea is a condition likely to benefit this class of sufferers, and that towns and stations at an elevation of 4000 or 5000 feet in the temperate zones, and 8000 or 9000 feet between the tropics, are eminently calculated from their position to check the progress of phthisis.

We are now in possession of a large number of observations made at such places as Davos, in Switzerland (5000 feet), showing the correctness of the present assertion. Even in 1869 Dr Hermann Weber collected a number of cases of consumption treated

\* "On the Treatment of Phthisis by prolonged residence in elevated regions," 'Med.-Chir. Trans.,' vol. lii, 1869.

successfully in Switzerland and in the Andes ; and Dr C. T. Williams, in an interesting paper to the International Medical Congress in London, 1881, also relates a number of instances in which patients had obviously benefited very much from winters spent at Davos ; many being sufficiently restored to health to be able to resume their ordinary occupations.\* I cannot help questioning, however, how far the cold experienced, in winter, in resorts of this description, under temperate latitudes, is beneficial. I am told, indeed, that a sudden accession of cold is dreaded by invalids at Davos, and that near the hour of sunset those who may be some little distance from their residence are seen hurrying home as fast as possible. Indoors, of course, the temperature is kept up artificially, while out of doors the sun with its hot rays warms the open air and makes it most enjoyable, the snow being prevented from melting on account of the cold it has absorbed during the night.

Towns situated near the equator, at an altitude sufficient to prove effectual against phthisis, would, I cannot help thinking, offer perhaps greater assistance to such patients, who could remain there for several years and thus secure a perfect recovery, which it is not easy to do in the north.

The distance to travel and the difficulty of reaching these stations, the uncertainty as to accommodation, and many other circumstances, must,

\* "The Treatment of Phthisis by residence at high altitudes," 'Transact. of the Congress,' vol. ii.

however, militate against their being used extensively as health resorts.

Mr Edward Whymper, whose remarkable travels amongst the Andes are so well known, has most kindly answered a few inquiries I made from him as to the towns which, from his observations, he thinks most likely to suit consumptive invalids in the equatorial districts. He writes to me as follows :

“The places most suitable for such a purpose as you mention are :

	Height.		Distance from Guayaquil.		Highest temperature observed.		Lowest temperature observed.
Riobamba	. 9030	...	4 to 5 days	...	61°	...	57°
Ambato	. 8630	...	5 to 6 „	...	70	...	62
Quito	. 9353	...	8 to 9 „	...	62	...	57

“*Riobamba* is the nearest place of the three to Guayaquil (the only port by which it would be practicable for an invalid to enter). It is a regularly-built town of several thousand inhabitants, with large and wide streets, and has a great many paths leading away from it in which shady walks might be taken. It has a small place which is called “hotel,” but it is distinctly to be avoided. Lodgings or entire houses could be procured, and in course of time a person might settle down and make himself comfortable, but it would be very uphill work at first. Food is plentiful and not bad.

“*Ambato* is a somewhat larger town, with perhaps 7000 people, about half a day’s journey further from

Guayaquil. The so-called hotel here is not so very bad, and could be made use of until apartments could be had. Parts of houses and entire houses were to be had here during my stay. Food is easily obtained, and the place is more desirable and more lively than Riobamba, as all the Quito traffic passes through it. Fleas are very abundant in both these towns.

"*Quito* is preferable to either place for a long sojourn; population about 35,000, and almost everything can be procured, but foreign produce is very dear. Numerous houses to let here at low rentals. There was only one hotel, kept by Giacometti, a Corsican, which was not so very bad, and would do to use until persons could settle down. Quito, only slightly higher than Ambato and Riobamba, is much colder than those places; few fleas there. Shady walks can scarcely be procured in the neighbourhood of Quito.

"Persons now occasionally go to Ambato from Guayaquil to escape the heat, and from Quito and other places to escape the cold.

"In all three places persons might make themselves comfortable in course of time, but the difficulty is to get to them from Guayaquil, for it is precisely in this part that the road is so bad, and an invalid, unless accompanied by an experienced courier, thoroughly up to all that was likely to be met with, would find the journey simply killing."

Mr. Whympers concludes his letter by remarking that every variety of climate can be had according to altitude, but he found its equality wearisome. Accord-

ing to common report, consumptives are almost unknown in the interior. Coughs and hollow cheeks are, however, common enough at Quito.

Dr Weber in his paper gives the account of several cases which had done very well in the Andes, and amongst other places at Quito, and at Jauja at an altitude of from 10,000 to 11,000 feet above the sea. But one of the important conditions of the success obtained was the fact that the patients made a prolonged stay in these high stations without returning into the plains.

The climate of the towns in the Andes, available as health resorts, unite those very conditions which may be expected to benefit consumptive invalids. These are altitude, warmth, equality of temperature, and atmospheric dryness.

The following table of the mean monthly temperature in the towns of Mexico (7470 feet) and Quito (9353 feet) shows how very equal it is.

	Mexico.	Quito.
January . . . .	52·5°	58·2°
February . . . .	54·2	61·0
March . . . .	61·2	60·0
April . . . .	63·0	59·8
May . . . .	66·2	60·6
June . . . .	65·4	59·0
July . . . .	66·1	59·2
August . . . .	65·0	60·9
September . . . .	64·3	61·3
October . . . .	60·2	59·9
November . . . .	55·8	59·6
December . . . .	52·1	60·5
Mean . . . .	60·4	60·1



But in addition to warmth and equality of temperature, one of the main conditions of the beneficial influence of these stations in consumption, is the dryness of the atmosphere. In Mexico, for instance, although during the months of June, July, August, and September, heavy rain falls in the valley, and notwithstanding that the town is surrounded by Lagunas which often overflow into it, the hair-hygrometer only registers in general between 75° and 85° F., and may show a much lower figure. Rain falls rarely in the other months, when the air becomes exceedingly dry, and, except in a few very damp spots, exhibits seldom more than 35 to 40 per cent. of relative humidity. In April and May it occasionally falls to 25 per cent.

Dr Symes Thompson, in an interesting paper on "The Elevated Health Resorts of the Southern Hemisphere,"\* alludes to the sanitary influence of the South African colonies—the Cape, Natal, and also the Free States or Orange River Republic, situated at an average elevation of about 5000 feet above the sea level. The inference to be drawn from his statements is that these high stations are the most appropriate in those colonies to benefit consumptive invalids. He remarks: "The climate of the Free States is extolled by all as exhilarating and health-restoring. Many go there from the Cape and Natal by the advice of local doctors, and as a rule return to their less bracing homes greatly invigorated." Unfortunately, the Free

\* 'Med.-Chir. Transactions,' vol. lvi, 1873.

States are difficult to reach, and may not be found to offer the comforts desirable for an invalid.

Before concluding this chapter, I must refer shortly to the causes of the immunity against consumption and of the influence exerted towards the cure of this affection, at certain altitudes above the sea.

The climate of alpine stations (in our latitudes) is, as a rule, comparatively cold and dry, while the atmosphere often exhibits that antiseptic power observed in Egypt, on the North American prairies, on the Peak of Teneriffe, and also at Davos. Dr Weber remarks that meat at this last station "becomes dry and remains sweet for many months, especially in winter. According to Pasteur, air from the "Mer de Glace," near Chamonix, did not cause fermentation, while that bottled at Chamonix did."\* I have had an opportunity of referring to the action of dry air on the function of respiration. As to the influence of cold on consumptive patients, it has been stated that I can hardly think it beneficial. People, however, after wintering at Davos generally consider the cold as less objectionable than might be thought at first sight. There is, moreover, a circumstance accounting for invalids being able to withstand cold at Davos, to which I shall allude presently.

I have for several years devoted part of a summer holiday to an experimental study of the influence of

\* Discussion of Dr C. T. Williams's paper at the International Medical Congress, 1882.

altitude on respiration,\* and have come to the conclusion, that the immunity against phthisis and the influence towards the cure of this affection peculiar to mountain districts are due to the two following circumstances :

1. The dryness of the atmosphere.

2. The increased readiness with which the oxygen of the air finds its way into the blood, while at the same time the carbonic acid formed inside the body passes through the pulmonary tissue into the air breathed with a greater degree of facility than at lower altitudes.

I have made a large number of experiments undertaken at altitudes varying from the seaside to 13,685 feet (summit of Breithorn), in order to determine the proportion of air breathed and carbonic acid expired at different heights, and although it is not my intention to enter in détail into these researches, I shall beg to give a few illustrations of the results obtained.

In my early inquiries on the shores of the Lake of Geneva, 375 metres (1230 feet), the mean of two series of experiments gave for 1 gramme (15·432 grains) of carbonic acid expired, 13·9 litres (1 litre=a little over a quart) of air exhaled, say breathed ; while the mean of a number of experiments made at the St Bernard (Hospice), the Riffle, the St Théodule Pass, and the summit of the Breithorn, ranging in

\* 'Proceedings of the Royal Society,' 1878, 1879, 1881, and 'Bibliothèque Univ.,' 'Archives des Sc. Phys. et Nat.,' 1881.

altitude from 2473 metres (8115 feet) to 4171 metres (13,685 feet), yielded for 1 gramme carbonic acid expired 11·05 litres of air breathed instead of 13·9 litres. The volumes of air expired in all these experiments are reduced to seaside pressure and freezing point.

More recently, in 1880, while on the borders of the Lake of Geneva I was expiring 1 gramme carbonic acid for 15·4 litres of air breathed, on the summit of the Col du Géant (11,030 feet) I only exhaled 12·6 litres of air. A young friend, who also submitted himself to these experiments, expired 13·7 litres of air near Geneva for 1 gramme of carbonic acid, and only 12·6 litres at the summit of the col. On the Island of Teneriffe, at the seaside, I breathed 12 litres of air for 1 gramme carbonic acid expired, and at the foot of the terminal cone of the peak, at 3580 metres (10,700 feet), the volume of air I emitted from the lungs fell to 10·3 litres for the same amount of carbonic acid. This influence is apparently more or less marked according to persons; the exceptions to the rule, I have observed, are very few, and cannot possibly affect the result obtained.

A Swiss gentleman, Dr Mermod, experimenting at two stations varying only from 124 metres to 1100 metres, or by 3202 feet, obtained results corresponding with mine which were published in 1877.\* From his figures I have calculated that at his lowest station he expired 14·61 litres of air, and at his highest only

\* 'Bulletin de la Soc. Vandoise des Sc. Nat.,' vol. xv.

13.11 litres, for every gramme of carbonic acid given out.

It follows that at a certain altitude above the sea level, less air is taken into the lungs to burn a certain weight of carbon inside the body than at the seaside; or, in other words, for two altitudes differing within certain limits, a person will breathe a smaller weight of air at the highest station to produce the same chemical effects within the body as at the lowest. This means that *elevation facilitates the passage of the oxygen of the air through the lungs into the blood, and the exit of the carbonic acid from the blood into the external air.*

I fully believe that the above explains in a very great measure not only the fact that the inhabitants of mountain stations, especially those belonging to the agricultural class, are, as a rule, proof against consumption, but also the power these stations possess of checking the progress of phthisis. It is indeed obvious that where the pulmonary tissue is damaged, the more ready passage of the oxygen of the air through it, and the more ready exit of carbonic acid in the light air of the higher stations, will exert a strong tendency towards restoring the healthy nutrition of that tissue.

From the increased tendency of oxygen to pass through the lungs into the blood in Alpine regions, it may be concluded that in those high districts the oxygen of the air is more likely to become available under circumstances calling for increased oxidation,

such as cold air, the ingestion of more food, and greater exercise. Direct experiment shows that this is actually the case, and in my experiments, except in one case to be presently referred to, I invariably found in the Alps, within a given time, an increase of carbonic acid expired in elevated regions, where the air was comparatively cold, over that given out in lower and warmer districts. Dr Mermod obtained a corresponding result although the temperature of the air was the same at both stations; this I account for from the necessity of a greater combustion in the body at the higher station to make up for the cold produced by increased evaporation from the body. Such a ready tendency of oxygen to pass through the lungs into the blood would explain the power of resistance to cold invalids experience in winter at such places as Davos.

Dr C. T. Williams states (International Congress 1881) that he finds from direct measurement, an increased size or capacity of the chest of consumptive patients on their return home after wintering at Davos. This is a very satisfactory result; it must be owing to the muscles of the chest having become accustomed to exert a greater degree of expansive power in order to enable the lungs to take in an increased bulk of lighter air, but it should not be forgotten that the actual volume of air breathed at Davos, reduced to the seaside pressure and freezing point, would show, as I can safely infer from my experiments, a



tendency to be rather *smaller* than at lower altitudes ; or it may be said that there is a tendency to breathe a *smaller weight* of air at Davos than near the sea level. On returning to lower stations in the spring, this increased expansion will certainly dispose towards the inhalation of a larger volume of air, and direct experiment will probably show that more air is breathed than before the visit to Davos. I am not aware, however, whether this increased size of the chest is of a lasting character. Moreover chemical analysis will have to determine whether oxygen enters the blood through the pulmonary tissue in proportion with the increased volume of air breathed, as it does under ordinary circumstances.

It has been observed by Dr Jourdanet that the inhabitants of towns situated at great altitudes above the sea are pale and anæmic, and have less natural energy than those who live under a higher atmospheric pressure. Dr Jourdanet's observations were made during a stay of many years at Mexico, 7470 feet above the sea, and he believes that the weakened and anæmic appearance of the inhabitants is owing to an insufficiency of oxygen absorbed through the lungs. I have had an opportunity of making a similar observation with reference to the monks of the Great St Bernard (8115 feet), who after a time experience a debilitating effect at that altitude.

Our sensations on the Col du Géant, at a height of 11,030 feet, were quite in accordance with Dr

Jourdanet's remarks ; My young friend, about 25 years of age, and myself, we both felt less energy and power than below, and after spending three days at that place were glad indeed to get down again, but the remarkable feature of the results obtained at the "Col du Géant" was that, although oxygen found its way more readily through the lungs into the blood than at the level of the Lake of Geneva, still the absolute amount of oxygen supplied to the blood was decidedly less than at the lower station. Thus, while I was expiring a mean of 0·538 grammes of carbonic acid per minute near Geneva, I only gave out 0·435 grammes of carbonic acid at the summit of the "Col du Géant" (11,030 feet), or 19 per cent. less ; and my friend, who expired a mean of 0·776 grammes of carbonic acid near Geneva before leaving for the "Col," expired only 0·609 grammes on the summit, or 21·5 per cent. less. It should be borne in mind that at altitudes of 4000 or 5000 feet only, there would have been in all probability an excess of an inverse kind, more carbonic acid being given out at those high stations than near to the sea level. It is therefore easy to understand that at elevations exceeding 7000 or 8000 feet, although the oxygen of the air reaches the blood through the lung-tissue with increased readiness, as shown by the fact that less air is required to be inhaled to produce a given weight of carbonic acid, still the absolute amount of oxygen supplied to the body is smaller than at lower altitudes. This, indeed, appears to be the result of my

experiments, and would reconcile the tendency to anæmia met with above 7000 or 8000 feet, with an immunity against phthisis and the influence towards the cure of consumption found to exist at those same altitudes.

Animals, however, and probably also human beings, appear to become acclimatized to the light air of stations situated at a considerable altitude above the sea. This is found to be the case from recent experiments of Paul Bert of a most interesting description,\* showing that blood taken from a number of different animals at the town of La Paz in Bolivia, altitude 12,139 feet above the sea, when shaken with oxygen gas in Paris, absorbed a much greater amount of the gas than the blood of similar animals living near the sea level. The author of this remarkable observation is careful to state that blood, although kept for a considerable length of time, does not alter on that account with reference to its power of absorbing oxygen. He concludes that at such altitudes the blood becomes richer in "hæmoglobin," or colouring matter, known to be the substance which fixes the oxygen of the air in the blood circulating through the lungs. It is, therefore, not surprising, adds Mr Bert, that animals living so very high above the sea should escape the ill effects that a low atmospheric pressure would exert on animals recently taken up to such altitudes. A similar remark applies to the human being, and it would appear that after a length of time, probably

\* 'Comptes Rendus de l'Acad.,' Mars, 1882.

a lapse of several generations, a certain degree of acclimatisation is obtained on very high stations enabling people to become strong and live in good health.

# THE PRINCIPAL HEALTH RESORTS IN SWITZERLAND

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## CHAPTER XI

CHAUMONT. THE RIGHI HOTELS. ST BEATENBERG.  
MONTE GENEROSO

I INCLUDE these four stations under one group, because they resemble each other in many respects. Their altitude, between 3580 and 4700 feet, is sufficiently great to give their climate a bracing character, and their distance from glaciers and snow-clad mountains protects them from the harsh, cold, and dry air of icy Alpine regions. They occupy a position on slopes adjoining a lake, and are exposed to a warm and damp air rising from below.

At some little altitude above Alpine lakes fogs are liable to form; they are suspended over the surface of the water, and cover the dark forests of the lower valleys, appearing from such stations as those heading this chapter as a sea of clouds, through which the higher mountains protrude near and far like so many islets. At the same time, an invalid looking down upon the mist will be enjoying a bright sun in a

cloudless sky. It occasionally happens, however, that the ascending warm air reaches a higher level before the condensation of its moisture begins, and forms into an impenetrable fog at these stations, while the absorption of heat by the vapour creates a sudden and very keen accession of cold. Thus it is that on the Righi, although the air in midsummer is usually warm and pleasant, the weather is liable at any time to become damp and chilly.

Fogs are not uncommon at such places, and I recollect on one occasion, now many years ago, witnessing on the Righi Kulm the phenomenon of the spectre of the Brocken, when a dense fog was rising in the east shortly before sunset; the shadows of objects occurring between the sun and the bank of clouds were reflected and seen magnified in the mist to a wonderful degree.

#### CHAUMONT

The Hotel or Pension de Chaumont is at an altitude of 3585 feet above the sea, and 2148 feet higher than the Town and Lake of Neuchatel. The distance from Paris to Neuchatel can be travelled in twelve hours, and it is the nearest health resort from England of an Alpine character. There is a good carriage road from Neuchatel, and the hotel is reached after a two hours' drive. It stands in an open space surrounded by a forest of fir trees, which extends down to the lake side; there are charming walks on level



ground to be taken in the immediate neighbourhood. Just beyond the hotel is the so-called "Signal," 200 feet higher up, from which a fine view is obtained of the Lakes of Neuchatel, Bienne, and Morat, and, further away, of the Wetterhorn and whole range of the Bernese Alps, while the Matterhorn and Monte Rosa groups may be seen in the distance. The hotel is comfortable, and can accommodate over a hundred guests. It is sheltered on the north side, and partially so on the east and west. The north-east wind is sometimes felt there strongly, and the weather may be cold and foggy even in midsummer. It is, a good summer station, and the managers of the hotel, Mr and Mrs Ritzmann, are most obliging and attentive. Besides "the Hotel-Pension" there is another smaller hotel.

#### THE KALTBAD

is one of the hotels on the Righi at an altitude of 4727 feet. Dr Lombard, in his book on 'Mountain Climates,' published in 1873, describes this station as well known to the many patients who resort to it every year to enjoy the benefit of a bracing air, and he remarks that it is well suited to debilitated constitutions, people with disordered stomachs, others suffering from muscular debility, and, in short, to persons whose circulation requires stimulation from fresh Alpine air in constant motion. No doubt but that this station was formerly a favourite resort for a wide class of

invalids, but since the railway has been opened in 1873, the Righi, with its lofty summit, is daily besieged by a stream of tourists, and the Righi hotels—the Kaltbad, Righi Staffel, and Righi Scheidegg—are crowded with visitors from July till the middle of September. Should heavy clouds gather around, and the weather become bad, these hotels empty themselves as by magic, filling up again equally fast as soon as the sky has cleared up. Clouds are not long forming on the Righi, and a Scotch mist, with a drizzling rain and perhaps snow, even in midsummer, take possession of the grassy slopes. An invalid could hardly expect quiet and rest of mind and body in the midst of such crowds of tourists, and although the spot would undoubtedly be found bracing and invigorating, patients might not be unlikely to complain of the cold, while in fine weather they would soon clamour for a more peaceful retreat.

#### ST BEATENBERG

This establishment is a favourite summer resort mainly for the Swiss and Germans. It is situated on the chalk cliffs skirting the north side of the Lake of Thun, and the building stands on a long horizontal plateau, which stretches from east to west, to a distance of four or five miles. The Niederhorn and Gemmenalphorn overhang this spot at the back, protecting it from the cold winds, while the front,

facing a south and south-west aspect, is fully exposed to the sun. The altitude of this station is 3763 feet above the sea, and exceeds that of the Lake of Thun by 1837 feet. The kurhaus is situated at the western end of the village, and holds 150 beds. It is reached from Interlaken by a good carriage road in two hours and a half. The station commands a beautiful view of the Bernese Alps, including the Youngfrau, Eiger, Mönch, Finsteraarhorn, &c., and in its immediate neighbourhood there is a variety of pleasant walks in and out of the pine forest, some of them on the level ground.

The climate of this place is mild, as shown clearly by its vegetation; thus, at an agricultural exhibition at Berne in 1867, a prize was awarded to Mr Krähenbühl for fruit grown at St Beatenberg. It is a favourite station during the months of June, July, August, and September; April and May are somewhat too early, although when the weather is fine in May, St Beatenberg may even at that period of the season, be ready for visitors.

This spot is frequently visited by people who, having spent the winter on the Riviera, are in want of a somewhat bracing climate in the spring; the air is not particularly dry, and on that account St Beatenberg appears better suited to cases of bronchitis than of phthisis. It is also questionable, for this very same reason, how far this station should be recommended for consumptive invalids leaving Davos after the winter season, although it has assumed its green vernal aspect by

the time the snow melts in the high valleys of the "Grisons."

As a winter station for consumptive invalids its atmospheric humidity appears rather too high, and it can hardly be considered to hold out the same inducements as such places as Davos.

From the scale of prices charged at the kurhaus it may be considered that St Beatenberg is not an expensive place to live at.

### MONTE GENEROSO

This station, above the beautiful Lake of Lugano (Canton of Tessin), and at an altitude of 4035 feet, has become well patronised within the last few years as a summer resort. The opening of the St Gothard Railway has brought the town of Mendrisio, the nearest to the Monte Generoso, to a distance of only seven hours and a half's journey from Lucerne, while it is reached in a little over two hours from Milan, on the Italian side. The ascent to the Hotel commences at Mendrisio, and takes two hours and a half to complete; an hour and a half longer being required to attain the summit of the mountain.

The hotel is a large building, opened from the 1st of May to the 15th of October, and I am informed by its proprietor, "Doctor Pasta," that during the months of May, June, and July the place is visited exclusively by English, while in August and September till the 15th of October the majority of the guests are

from England. The position of the hotel, on the mountain slope overlooking the Lake of Lugano, is well suited for a health resort. Its distance from snow-clad mountains and glaciers, and its situation above one of the warmest districts in Switzerland, ensures protection against cold and sudden changes of temperature; the thermometer is seldom observed to fall more than five or six degrees, even after two or three days' rain. The building faces the southern aspect, and is sheltered from the northerly winds by a wooded hill.

In summer the evenings are so warm and pleasant, and so free from dampness, that guests may while away the time out of doors till ten or eleven o'clock. Water is very scarce on the mountain, and the present owner had to supply the hotel from a spring at no little trouble and cost. Fogs and dews are seldom met with in summer, though more frequent in autumn.

There are very pleasant walks, on ground nearly level, in the neighbourhood of the hotel; one of them, amongst others, takes an hour to complete, and affords a very beautiful view of the Lake of Lugano and Swiss Alps. I hear from an eye witness that the sunsets as seen from this station are at times remarkably fine. My informant, who was there some years ago, was much struck with the quantity of wild rose trees about the woods, and thought the scenery beautiful.

As a health resort the Monte Generoso suits anæmic people, and those suffering from chronic affections of

the stomach and nervous system; it is also well adapted towards recovery after a long and debilitating illness.

This station is a convenient place for a temporary residence after wintering on the Riviera, on account of the bracing qualities of the air at that altitude, free from any keen accession of cold. Part of May and the month of June may be spent most pleasantly on the Monte Generoso, while waiting for warm weather at home.

The Monte Generoso will undoubtedly have many admirers, while some visitors may fall on bad weather or an exceptionally foggy season, and not find the spot equal to their expectation.

There are several health resorts in the Jura Mountains, the principal of which is, perhaps, the Weissenstein (4219 feet), at three hours' walk or drive from the Town of Soleure. Its isolated position, and the free access of air to this station from every side, offer inducements to invalids in search of fresh air and who do not mind occasional winds. The climate is bracing though not cold, but it is rather liable to sudden changes of temperature. The kurhaus, surrounded by woods and meadows, has been patronized largely for many years past.



## CHAPTER XII

HEALTH RESORTS IN THE GENEVA AND RHÔNE VALLEYS,

TO WHICH ARE ADDED

CHAMONIX, COURMAYEUR, THE GURNIGEL, AND

ENGELBERG.

GENEVA is now a twelve hours' journey from Paris only, and eighteen or nineteen hours from Cannes, and although from want of shelter against the winds it is hardly to be included amongst health resorts, yet within a short distance from Geneva there are stations of no mean value for invalids.

### MONTREUX

The basin of the Lake Lemman extends from Geneva nearly due north, and then describing a semicircle, inclines towards the east, so that the towns dotting the northern shore beyond the curve face the southern aspect. They are sheltered at the back from northerly blasts by hills rising to heights varying from a few hundred to several thousand feet, and the last five or six hundred feet of the slopes, as they descend towards the lake side, are covered with vineyards. The wine they produce has a well-deserved reputation in

Switzerland, as on these sheltered hill sides, fully exposed to the south, the grape ripens thoroughly.

That part of the lake side which affords the best sites for health resorts extends from Clarens to Chillon, including the town of Montreux, and the villages of Territet and Veytaux, and ranging a little over three miles. Each of these charming lake retreats have a steamboat pier with six boats calling daily in summer in each direction, and a railway station, while hotels and villas are seen amongst the trees, and continue multiplying with amazing rapidity. There are few places where such varied and good accommodation can be found as at Montreux, Clarens, or the neighbouring villages; and I could hardly point out any place where the comforts of an invalid may be had at a more moderate expense.

Fifty years ago there was not a single hotel in the place, but only one or two inns—"logis," as they were called—for travellers and wine dealers. The very first appearance of a boarding house, though on a very moderate scale, was between the years 1815 and 1820, and the earliest hotels were built in 1840. Since the opening of the railway, hotels and boarding houses have risen like magic; in 1877 there were some sixty of them, and Montreux could then make up about three thousand beds. The accommodation for strangers has continued increasing, and villas built on sites of a most picturesque description can now be hired for a season. Forty years ago Montreux had two shops only, while at present Clarens, Vernex, and Montreux can

boast of shops equal to those of Vevey and Lausanne. Territet, a mile from Montreux, formerly a poor hamlet, now contains an English church and five hotels.

*Glyon*.—At 1000 feet above Montreux, high up amongst the trees and rocks, a large building is seen, the Hotel du Righi Vandois at Glyon. It is reached by an excellent carriage road in three quarters of an hour from Montreux, or pedestrians can walk up through a charmingly shaded glen, halting for a few minutes to admire the spot called *Le Chaudron*, where a waterfall under a mass of foliage has worn out the rocky bed of a stream into a deep recess. Glyon, nearly 2000 feet above the sea, is not so well sheltered from the wind as Montreux, but invalids who wish for a bracing air without rising very high will find this spot most enjoyable. The view of the lake from Glyon is beyond description; delightful walks can be taken in its vicinity through mountain paths and wooded lanes, and the place has become a favourite resort in summer both for invalids and people in the enjoyment of health. I understand that a railway is contemplated from Montreux to Glyon.

*Les Avants*.—Another excellent road leads from Montreux to a village further back in a high valley, on the way to the “Col de Jaman,” called Les Avants. This spot, about 2000 feet above the lake and 3212 feet above the sea, is reached after a drive of an hour and forty-five minutes through walnut trees, oaks, chestnuts, firs, and other trees casting a pleasant shade; it

is a very pretty drive, the exhilarating sensation from the lightness of the air becoming quite obvious some forty minutes after leaving Montreux. The hotel, a fine building, stands prominent amongst some twenty or thirty straggling houses; its position is unique for shelter against northerly winds, the mountain rising at the back in a sort of amphitheatre, while it faces the south-west. Away at a considerable distance below, a corner of the dark blue waters of the lake, and the mountains beyond, limit the view in that direction, while on the left the entrance of the Rhône Valley, with the lofty summits towering above it, form a picture of exquisite beauty. Within immediate reach of the hotel runs a mountain stream of the clearest water, partly concealed under a thick foliage, and the smooth grass slopes round the hotel may be readily taken for an English lawn.

While on a visit to *Les Avants* this summer I obtained much useful and trustworthy information on its characters as a health resort, especially in winter, from a physician who had spent there a part of last winter season. He said that from the end of January, when he took up his residence at Les Avants, the weather had been very fine, and it frequently happened that while the sky was clear and blue, all below disappeared in a sea of clouds. He had observed that fogs when visiting this spot are often dry, unlike those which deposit moisture on grass, benches, and other objects. Last winter there was very little snow, but the winter before, it fell heavily at times. During the winter 1881-82 ice never formed thick enough to bear

the weight of a man ; the year before it was much thicker. The winds are few and mostly limited to the south-west or Fœhn. The common bise or dry north-east wind is not felt. In winter the sun is quite warm, and coffee can be taken under the hotel verandah. The relative humidity during the summer is about 60 per cent. at midday, and 72 per cent. in the evening ; it is also low in winter.

A few consumptive invalids have wintered at Les Avants, but their number has not been sufficient to allow of any conclusion to be drawn as to the influence of the climate on such cases. The gentleman from whom I hold the present information has known, however, cases of phthisis do well there in the cold season.

The hotel is large enough to accommodate 120 guests, and is usually full, or nearly so, in summer, while in winter there are from twenty to thirty people. The principal amusements are excursions in the neighbourhood, while the tennis court is occupied from morning till dusk.

I believe that "Les Avants" is likely to become more and more a favourite winter resort for invalids, while in summer it is a charming spot for a few weeks' residence. Except for two hours in the middle of the day, when the sun is decidedly hot in July and August, the weather in summer is cool, bracing and pleasant.

The climate at Montreux and its neighbouring resorts on the lake side is very different from that of

“Les Avants.” It is too warm in July and August to be pleasant for a lengthened residence, but in spring and autumn the air is mild and soft, and quite warm when the sun is out, while thorough protection from the north winds is a security against cold. Its weather is, however, somewhat uncertain.

From observations by Dr Carrard at Vernex (1863 to 1870) published in the ‘Bulletin de la Commission Fédérale de Météorologie,’ the following are the mean temperatures obtained for the six winter months at Montreux:

Nov.	.	.	.	42·4°	Feb.	.	.	.	39°
Dec.	.	.	.	37·2°	March	.	.	.	40·8°
Jan.	.	.	.	35·2°	April	.	.	.	51·3°
Mean	.	.	.	.	.	.	.	.	41°
Greenwich	.	.	.	.	.	.	.	.	41·8°
Cannes	.	.	.	.	.	.	.	.	50·4°

It follows that the *mean* winter season, as far as temperature is concerned, is no better at Montreux and its neighbouring villages than it is in London; but while December and January are decidedly colder at Montreux than at Greenwich, February and March show about the same temperature at both places, and November and April are decidedly warmer at Montreux; the mean for April is at Greenwich 47·2° instead of 51·3° at Montreux. Hence it is that the autumn and spring are the best seasons on the sheltered stations on the Lake of Geneva; and these spots will be found very convenient as half-way stations for consumptive patients, especially in April or May, when the



season is too warm for them on the Mediterranean coast and still too cold in England. Montreux is, moreover, less liable to sudden changes of temperature in the spring than the British climate.

As at most places in Europe, the amount of rainfall at Montreux is very uncertain, but it must be admitted to be relatively somewhat high. From 1863 to 1870 the yearly average amounted to 50·7 inches, while at Bex, another station a short distance in the Rhône Valley, it only equalled 35·2 inches, the mean at Geneva being 32·4 inches.

### BEX,

Although only fifteen miles from Montreux, is somewhat different in its position and aspect as a health resort. This village is built on a very picturesque spot near the opening of a gorge adjoining the Rhône Valley; it is reached from the railway station after a twenty minutes walk or a short drive. Bex is a quaint old place, but it can boast of some of the best hotels in Switzerland. One of them, the "Hotel des Salines," has an establishment of salt water baths attached to it, and enjoys, moreover, a most beautiful view of the Dent du Midi with its snowy arête, and of the "Grand Muveran" towering over the village. A mountain stream rushes down the hill, supplying the hotels and pensions with excellent water.

Bex has become a favourite station, especially in October and November, and April and May. It is

well sheltered from the northerly winds and fully exposed to the south. It has more of an Alpine character than Montreux, and its climate is decidedly drier, while the weather is more likely to be fine. I have always held Bex in great estimation for invalids after wintering on the Riviera, and many, in accordance with my advice, have spent some weeks there in April or May, before returning to England. There is a freshness of the air in the spring at Bex which makes it peculiarly pleasant; the wild flowers in the green meadows, countless butterflies, the rustling breeze as it drops softly from the lofty summits, the charming contrasts of light and shade, the murmur of the mountain stream, everything unites to quiet an excited state of the nervous system and restore strength and health.

On comparing the climate of Bex with that of Montreux but little difference will be found in the temperature, although the mornings and evenings are cooler at Bex. It is remarkable that, notwithstanding the greater rainfall at Montreux, still there is rather more moisture in the atmosphere at Bex, the mean relative humidity amounting to 79 per cent. at this station and 77 per cent. at Montreux. The village and its neighbourhood are exposed to the Fœhn or warm south-west wind, which blows mostly in the spring and autumn, and is sometimes very violent, although not of long duration. Fogs are seldom met with at Bex, where it sometimes happens that the sun shines brightly while a thick mist hangs over the lake.

In its medical aspect Bex is more bracing than Montreux, while it is removed from the immediate influence of the lake. Some consumptive patients do very well at this station in the spring; they can remain there till June, when it will be found advisable, on account of the increasing heat of the weather, to adjourn to some higher station, such as the Les Avants or Champéry.

### LES ORMONDS

The "Vallée des Ormonds," especially that of the "Ormonds dessus," possesses a thoroughly rural character. Its green slopes dotted with chalets, its pure air thoroughly Alpine, and a few comfortable hotels, though laying no claim to extravagant luxury, attract every summer a considerable number of visitors wishing for repose in a quiet spot, bracing and healthy. The "Ormonds" extend east and west above the Rhône Valley, being closed at their eastern end by the lofty chain of the "Diablerets" (9944 feet). This valley is reached from the Village of Aigle, near Bex, by a good carriage road, and access is first obtained to the "Ormonds dessous" at the Village of the Sepey. Further on the Hotel de la Comballaz is met with in a wild Alpine district, at an altitude of 3205 feet, while the road beyond, in a northerly direction, leads to Château d'Oex. East of La Comballaz the valley is continued, the road ascending to the "Ormonds dessus" (3714 feet), and finally the Hotel des Diablerets

is reached at the very foot of the mountain from which it is named. This is a favourite resort when the weather is warm, but it may be visited by cold draughts in summer. The "Valleé des Ormonds" affords charming roads for an afternoon's stroll, while longer excursions may be taken in the neighbourhood. As to the ascent of the Diablerets, it is very interesting, and I may remark from personal experience that, although in no way difficult, it is a stiff climb, and should not be attempted without some experience of mountaineering.

#### VILLARD SUR OLLON

Carriages are taken, to drive up to Villard, either at Bex or Aigle. Villard is built on a plateau sheltered from the north by a hill covered with forest. The rain falling on the neighbouring heights does not find so ready an exit from that plateau as might be wished, and the consequence is that the grass is luxuriant and thick, and somewhat suggestive of dampness. Villard, from its altitude of 4183 feet, is too high for a spring station, but answers well in July or August. Three good hotels stand on the green turf, and are well patronised during three months in the year. If it were possible to ensure fine weather at Villard and an absence of fogs, this would be one of the pleasantest spots in Switzerland for a month's stay. The air is extremely pure and bracing, and admirably fitted for weak children, or to hasten the recovery from some long

and debilitating illness. When the weather is set fair in summer, a visit to Villard will leave none but the most pleasing recollection.

### CHAMPERY

After crossing the Rhône Valley from Bex, the village of Monthey is reached, from which the high road ascends to Champéry, at an altitude of 3442 feet above the sea; the drive takes three hours and a quarter. Champéry consists of two rows of houses with the high road intervening between them, and has several hotels and boarding houses. The accommodation is good though somewhat Alpine in its character, and the last time I was there I noticed that little besides English was spoken at the table d'hôte of the Hotel de la Dent du Midi. Champéry is well known to tourists, who pass through it on their way from the Rhône Valley to Sixt over the Col de Cou and the Col de Goléze. It has become a favourite place for a summer residence, especially in July and August. The air is scarcely as bracing as might be expected from the altitude of the place; but the view is very beautiful, and Champéry is likely to suit a family wishing for a month or two of mountain air. Where a bracing resort is wanted, Morgins, a short distance from Champéry and at a greater height, will be likely to prove more suitable.

## MORGINS

This village, 4629 feet above the sea, is reached either from Monthey, in the Rhône Valley, or from Champéry, by an excellent carriage road. It is higher than Champéry by 1180 feet and Villard by 440 feet, but is more likely to agree with an invalid than this last station, being well sheltered from the wind on every side, not so damp, and less liable to fogs, while its air is exceedingly bracing. The village is a mountain hamlet of a few houses only, amongst which the hotel is prominent. A long wooden gallery, unassuming in its construction, is attached to it, which is used as a bathing establishment. The mineral springs supplying these baths contain iron and attract a certain number of bathers, but I expect that most English people would resort to Morgins for the excellent quality of its air. The want of a distant view gives the place a rather gloomy character, contrasting very forcibly with the cheerful landscape of Champéry; no snow-clad mountains are seen from the hotel at Morgins, the valley is everywhere covered with thick green grass, while hills rise above it in a succession of graceful slopes dotted over with chalets, and higher up dark forests limit the view.

People go to Morgins not so much to enjoy themselves as to benefit their health. The hotel is fairly comfortable, although open to improvement, and the waters may be taken in many cases with advantage



under the direction of a resident physician. I had a few years ago an opportunity of testing personally the effects of the air of this place after illness, and shall not forget my surprise at being able to ascend above a thousand feet three days only after my arrival, while at first I could hardly walk a short distance on level ground. I had previously tried Champéry, which had not proved sufficiently bracing. Of course, cold weather must be expected at times, even in midsummer, at an altitude over 4000 feet, and the nights and mornings are often very cool, so that a stock of winter clothing should not be omitted.

### CHAMONIX

This beautiful spot in the department of Haute Savoie, France, is so well known, and its lovely view of Mont Blanc and tributary glaciers has had so many admirers, that the place needs no description. Its altitude is 3445 feet above the sea, or precisely the same as Champéry. Its air is pleasant and bracing, and the change experienced on arriving there from England is very great. Chamonix is now at about thirty-two hours only from London, and is perhaps one of the best places to go to for people in search of a bracing air, with a short time only to dispose of. Nine or ten hours' journey are required from Geneva to Chamonix ; several " diligences " leave in the morning, or comfortable carriages can be hired. Chamonix may also be reached in two days from Geneva by the

Rhône Valley and Martigny or Vernayaz. The village is built in a valley running nearly north and south, so that it cannot be said to enjoy an immunity against winds. In July and August the sun feels decidedly warm in the middle of the day, but the air is so pure and invigorating that the heat is in no way oppressive. It is quite surprising how soon visitors in a weak state of health become fit for excursions in the neighbourhood. Those who do not care for walking can sit out in the woods with a book, or ladies can while away a part of the day in some shady spot. Should Chamonix be too warm or not bracing enough, nothing will be so easy as to hire mules and ride up to the Montanvert, where an excellent hotel has been lately built. The cold nights and mornings, however, are rather an objection to a prolonged stay at the Montanvert, and the air, from its dryness, may be found keen and irritating.

The main advantages of Chamonix are its proximity to England, its invigorating air, beautiful views, and the pleasant English society usually met with.

#### COURMAYEUR

Courmayeur, on the Italian side of Mont Blanc, at an altitude of 3945 feet, is 500 feet higher than Chamonix. The distance from Chamouix as the crow flies is eleven miles, and a tunnel under Mont Blanc between these two places would be 8 miles and 1230 yards in length, according to Dufour's map; this is

less than that of the St. Gothard, which measures 9 miles 4459 yards. Courmayeur is not so accessible as most health resorts ; it is reached from Turin by Ivrea, though only after a long drive. On the Swiss side, the Col Ferret (8139 feet) may be passed from Martigny, leading to Courmayeur along the southern aspect of the Mont Blanc range, but the journey of ten hours, either on mules or on foot, is long and fatiguing. The easiest way, coming from Switzerland, will be across the Petit St Bernard, and by a good carriage road.

The view of Mont Blanc from Courmayeur well repays the trouble of reaching the spot; excellent hotels are to be found in the town, and there is no want of charming walks in the neighbourhood for a stay of two or three weeks. While the weather may be cold and windy at Chamonix, even in midsummer, Courmayeur, sheltered on the north side by the Mont Blanc range, has a warmer and more equable climate, while occasional storms and showers freshen the air. Continued bad weather is probably less likely to be met with at this place than on the northern side of the Alps. The heat, however, is occasionally greater than might be expected, and during a stay of a few days I made at Courmayeur in 1880, I observed the thermometer to range as follows in the shade :

<i>July 15th.</i>		<i>July 16th.</i>
12.40 p.m.—77°0'.	...	8.30 a.m.—69°5'.
4.17 „ 76°0'.	...	11.40 „ 76°0'.
6.30 „ 66°5'.	...	2.55 p.m.—79°5'.
7.45 „ 63°0' (feels chilly)	4.5 „	80°0'.

<i>July 20th.</i>		<i>July 21st.</i>	
1.40 p.m.—76·0°.		... 9 a.m.—74·0°.	
3.45 „ 78·0°.		... 11.10 „ 80·0°.	
5.15 „ 78·0°.		... 3 „ 77·0° (thunder-storm).	
7.45 „ 65·0°.		... 4.5 „ 71·0°.	

Such warm weather is not, however, at all oppressive on account of the great dryness of the air. I found the relative humidity to only amount to 38 per cent. on one occasion, while on another it fell to 32 per cent. It should be borne in mind that the evaporation from the body, a cooling process, is much greater in dry than in damp air; hence it is that in such places as Courmayeur the heat is not unpleasant. As a health resort I should prefer Courmayeur to Chamonix; but in a social aspect Chamonix, with its large number of English, is undoubtedly qualified in a higher degree for English invalids. The visitors at Courmayeur are principally Italians, whose main object is to take its mineral waters.

### THE GURNIGEL

This is a very large establishment of mineral baths in the Canton of Berne, at an altitude of 3789 feet above the sea, and it has become an important health resort, not only because of its waters, but also on account of its bracing Alpine climate. The most convenient way of reaching this spot is by hiring a carriage at Berne; the drive will take about five hours. During the summer season two diligences leave Berne

daily for the Gurnigel. There is another road from Thun by the baths of Wissenburg, but it is less frequented, and one can only drive part of the way. I cannot resist the temptation of relating a little adventure which happened to me many years ago when walking up from Wissenburg to the Gurnigel, showing the use of carrying a compass and map while on a walking tour in the Alps.

I engaged a man at Wissenburg as a guide, who said he was well acquainted with the way, and off we started for a five or six hours' walk. We got on very well for two or three hours, then the path became a track, which finally disappeared in the midst of rocks and stones. About that time dense masses of fog were seen rolling up from below, and we were shortly afterwards enveloped in an impenetrable mist. It was becoming obvious that my guide no longer felt sure of his way; he wandered in one direction, then retraced his steps, then finally halted in a state of utter despair and ready to weep. I did my best to comfort him, and sitting down took out a pocket compass, telling him I carried with me a watch by means of which I could find my way in the mountains in a fog ever so thick. I also had a good travelling map with me, and finding on the map the spot we had reached, placed upon it the centre of the compass. I then showed my companion the way to which my "watch" pointed, and told him that was the direction in which the Gurnigel baths were to be found. He brightened up at once, though much surprised, and we walked on,

the fog rather increasing in thickness, and the shades of evening rapidly closing in. After a short time we reached a hut my companion at once recognised, and I could see his confidence in the wonderful watch was becoming greatly increased. After stopping at the hut a few minutes and again consulting the compass we resumed our walk, and striking the right direction, reached the baths with no further trouble.

The establishment of the Gurnigel has been much enlarged from time to time. On the north side of the main building there is a terrace 780 feet in length, beyond which extends a green grass slope surrounded by dark forests, while on the south side a long covered gallery has been constructed, extending from one end of the house to the other, and affording a convenient place for lounging and conversing in wet weather.

The country is extremely picturesque, giving the place something of the appearance of an extensive park. Many charming walks may be taken in the neighbourhood, and the pedestrian will find pleasant occupation for a week or two.

Dr Verdat, an experienced medical man from Berne, who has resided at the Gurnigel every summer for many years, has made a number of observations with reference to its climate. The following is an abstract of his records for the years 1870 to 1879 :



*State of the weather*

		Fine.		Variable.		Rainy.		Stormy.
June 10th to 30th	.	6	...	7	...	7	...	0·5
July . . . .	.	18	...	9	...	4	...	4·0
August . . .	.	16	...	10	...	5	...	6·5
Sept. 1st to 20th	.	13	...	4	...	3	...	7·1
		<hr/> 53	...	<hr/> 30	...	<hr/> 19	...	<hr/> 18·1

July and August may therefore be considered as attended, as a rule, with fine weather.

*Temperature*

		Mean.		Maximum.		Minimum.		Daily variation.
June 10th to 30th	.	55·8°	...	73·4°	...	39·2°	...	13·2°
July . . . .	.	59·7	...	81·5	...	46·4	...	13·5
August . . .	.	59·5	...	79·7	...	44·6	...	13·0
Sept. 1st to 20th	.	57·4	...	69·8	...	41·0	...	12·4

It should be borne in mind that in the height of summer very warm weather may be met with on mountain stations, but this only continues a short time, and seldom exceeds the last fortnight in July and the first few days in August; by the middle of August the temperature has already very much moderated. The lowest monthly readings show that the cold at night is one of the objections to mountain stations for invalids, unless the house they live in is substantially built with thick walls and windows closing well. Under such conditions the heat of the sun, together with that of fires, is retained in the bedroom, and no cold will be felt at night.

The atmosphere is not so dry at the Gurnigel as at

many other mountain stations. The hair hygrometer shows a mean of 81.09 relative humidity, and seldom falls below 60. Dr Verdat considers this moist state of the air as due in a great measure to the large extent of forest in the midst of which the establishment stands.

The prevailing winds are from the west and north-west. They are seldom strong on account of the shelter experienced from the neighbouring trees. Storms are rare in June, and attain their maximum of frequency in August.

Summing up the state of the weather at the Gurnigel, we find over 50 per cent. of fine days for the whole season; about 30 per cent. of uncertain weather including fogs, passing showers or storms. There remains 20 per cent. of rainy days, when no walks or excursions can be taken. September includes a large number of fine days, and were it not for the shortness of the daylight and the increasing cold at night, September might be one of the best months for this mountain station. The establishment is open from the beginning of June to the latter part of September.

There are three mineral springs at the Gurnigel; two of them are sulphurous, the other contains iron. The sulphurous waters are conducted through pipes to a fountain or Trinkhalle close to the establishment. Two minutes' walk on the west side of the baths leads to a small fountain, where the chalybeate water is drunk.

The waters are used for bathing, drinking, inhaling,

and douching. From Dr Verdat's statistics, which appear to have been prepared with much care, it is obvious that most invalids suffer from some disorder of the organs of digestion, coming especially under the heading of catarrh; 50 per cent. of these cases are eventually returned as cured. A comparatively small number apply for the treatment of nervous affections; some with enlarged liver hope to benefit from the waters; others with affections of the kidneys and bladder are also met with at this establishment. A certain number of cases belong to the anæmic and chlorotic class, and some few try the waters in the hope of finding a cure for alcoholism, malaria, or poisoning by mercury.

#### ENGELBERG

It is but a short distance from Berne and the Gurnigel baths to Lucerne and Engelberg. For those who do not wish to reside at Engelberg for any length of time, the place can be visited in a day from Lucerne without the slightest fatigue, and the excursion is, indeed, charming in every way. Leaving Lucerne by steamer at 10 a.m., Stanstadt, a harbour nestling in a pretty little nook not far from the foot of Mont Pilate, is reached fifty minutes later. At the arrival of the boat a number of carriages, with horses harnessed and ready to start for Engelberg, are seen drawn up close to the pier. Not a moment is lost, and you drive off at a brisk trot along the valley of Stanz,

between walnut trees and fruit trees ; the town of Stanz and two or three villages are passed, and the carriage stops at Gravenort at about 12.30. Near this place the ascent commences, and it is as quick and very pleasant for those who can walk to proceed on foot. The road is most of the way under the shade of lofty trees, and a halt is made every now and then to look down into the deep and dark valley to the right ; while a short cut through the wood, along a mountain stream of the clearest water, will probably enable the pedestrian to reach his destination sooner than by driving. Leaving Gravenort at five minutes to one this last summer, I arrived at my destination at ten minutes past two ; the weather was decidedly unpropitious, as clouds hung low in the valleys, and I found Engelberg capped by a thick fog.

Engelberg is a large village in a level valley, at an altitude of 3343 feet ; it is surrounded with high mountains, amongst which the Spancœrt, the Grassengletcher, and Titlis, with their bold outlines and snow-clad summits, are conspicuous. I was deprived of this magnificent view on the occasion of my visit, but it is acknowledged to be one of sublime beauty. Several good hotels are met with at Engelberg, and the Hotel Sonnenberg is spoken of as very comfortable. There are apparently very few shops in the place, one single establishment or bazaar supplying most of the wants of tourists. People spending a few weeks at Engelberg must put up, I should conclude, with a little roughing, as every home comfort can hardly be ex-

pected in high Alpine valleys, within a short distance of the realm of eternal snow and ice.

The number of visitors to Engelberg increases yearly, and in fine weather it is so difficult to find room, that application should be made before-hand. It has become a very favourite station for the English, who have now made Lucerne one of their principal headquarters in Switzerland. Those who have spent some time at Engelberg speak highly of it as a beautiful health resort, and it undoubtedly deserves to hold an important place amongst the Alpine sanatoria.

## CHAPTER XIII

### THE ENGADINE VALLEY, ST MORITZ, AND PONTRESINA

THE Engadine valley in the "Canton des Grisons" is situated at the extreme south-east of the Swiss Alps, and extends over a length of about forty-seven miles. Its breadth in the portion of the valley lowest above the sea, or "Basse Engadine," never exceeds a mile and a half, while in the Upper Engadine it increases to over three miles. It is the highest valley in the Alps, and none has so great an area.

Access is obtained to this lofty spot by several routes, the principal of them being by Zurich to Coire and over the Julier Pass; from Milan, by Como, Chiavenna, and the Maloggia Pass; and from Davos, over the Fluela Pass (7886 feet), into the Lower Engadine; then through Zuz, Zernetz, and Samaden. As an excursion the Fluela Pass is one of great beauty.

St Moritz, in the Upper Engadine, has an altitude of 5859 feet, and its air may be considered as possessed of bracing qualities exceeding perhaps that of all other localities in Switzerland. It is built on foot-hills as they rise from a small Alpine lake, and



appears, when viewed from the opposite shore of the lake, as a long line of houses extending in a diagonal line on the hill side across the green turf; a large building, the Kulm Hotel, is conspicuous at the highest part of the village. A five minutes' walk downhill from the houses leads to the south-west end of the lake, which lies comparatively low, and is the site of the kurhaus and several hotels. A row of small shops or wooden buildings is passed on the way to the kurhaus, with something of the aspect of a country fair about them; they appear to be doing a thriving trade during the season.

I recollect visiting St Moritz twenty-five years ago, shortly after the bathing establishment was open to the public, and when the beneficial influence of the mountain air of that locality was not acknowledged and sought for as it is now. It could then boast, I think, of only one hotel, and the valley was visited by a few tourists. The mineral springs of St Moritz proved originally its great attraction, but of late the air of the valley, with its invigorating and health-giving properties, has brought the place into very great repute as a summer resort. In 1539 Paracelsus had extolled the virtues of these springs, and others wrote about their medicinal properties in 1553, 1732, and 1819; but it was not till 1853 that the water was obtained in sufficient quantity for the object of a bathing establishment. Mr de Flugi, a native of St Moritz, then constituted a financial company, and the bath-house, together with the construction of a large hotel, were commenced

in 1854; two years later the building was open to the public. The water is drank from a fountain in a spacious hall; it is cool, clear, and sparkling, with a temperature of 42° F. throughout the year. Its principal constituents are carbonic acid, carbonate of sodium, and oxide of iron. The taste it possesses is peculiar, and, to my mind, recalls that of oysters, although becoming pleasant to drink after a time. The water is also used for bathing, but acts so powerfully on the body, that the baths are only allowed to last from a quarter of an hour to twenty minutes. On the occasion of my first visit it occurred to me to try how long I could remain in the water; after about twenty-five minutes, commencing to feel uncomfortable, I got out of the bath, but was so intoxicated and tottering from the effects of the carbonic acid, that I could hardly dress. I rushed out into the fresh air, but just able to stand, and had to take a walk round the lake before feeling quite well again.

The Valley of St Moritz is rather open and exposed to the winds. When I visited the spot this last summer a strong west wind was blowing. There are many gaps in the surrounding mountains through which draughts are liable to enter the valley, and it is quite open in the south-west. The shelter from the north also appears insufficient, the Kulm Hotel occupying perhaps the best position for escaping northerly blasts. Moreover, the lake and lower part of the valley, on which stands the kurhaus, must act to some extent

as a source of atmospheric humidity not altogether to be desired. The free accession of air to the valley is, however, beneficial in many respects, especially in the height of summer, and does away entirely with the sensation of closeness experienced in many narrow valleys better sheltered from the winds.

The fact that the Kulm Hotel is now lighted by electricity will give an idea of the importance St Moritz has acquired as a health resort. There is an English church. Parties of English residents are seen boating on the lake, walking about on the roads, and lounging along the lake side, and it is a wonderful place to meet friends one least expected to find in what has now become anything but an out-of-the-way station.

Dr Meyer Ahrens in his work on the Swiss mineral water, gives the following useful information on the climate of St Moritz. The season at St Moritz lasts in general from the 21st of June to the 10th September. The early snow in September frightens visitors away, but the weather continues usually very fine through September, and even in October. From observations taken three times a day during four years it has been shown that the *mean* temperature at St Moritz, throughout what may be called its season for visitors, is slightly over  $11^{\circ}$  ( $51.8^{\circ}$  F.). In the morning the thermometer registers barely  $6^{\circ}$  ( $42.8^{\circ}$  F.), in the evening  $9^{\circ}$  ( $48.2^{\circ}$  F.), at midday from  $15^{\circ}$  ( $59^{\circ}$  F.) to  $16^{\circ}$  ( $60.8^{\circ}$  F.). Two thirds of the days are dry and sunny, the other third rainy. Dew is heavy in the

morning, but fogs are much less often met with than elsewhere at a similar altitude. Snow falls but twice (as a mean) during the summer season in front of the bath-house. In winter snow remains on the ground of the Engadine Valley on an average five months and twenty-two days. Sudden changes of temperature are frequent both in summer and winter. Often, after the warmest summer days the thermometer falls to  $32^{\circ}$  F. during the night; while in winter, after a cold of  $25^{\circ}$  C. below zero ( $-13$  F.), it may suddenly rise to  $+5^{\circ}$  ( $41^{\circ}$  F.). These sudden variations depend in a great measure on changes in the direction of the wind from south-west to north-east and *vice versâ*. Spring and winter are usually rather damp, but the two other seasons are dry and fine.

About the end of October the weather becomes unsettled and stormy; still, from observations taken during ten years, it is not usually before the beginning of November (the mean day is the 11th) that snow begins to fall heavily, and the valley remains covered with it till the end of April.

A short time afterwards the sky again clears up, and the snow becomes hard and crisp, so that travelling is easily carried on in sleighs; indeed, communications are rather facilitated than otherwise, as the frozen lanes afford short cuts; and pleasant social intercourse is thus carried on amongst the inhabitants during the winter. In the month of March the sirocco or hot wind is not long in melting the snow on the slopes exposed to the sun. No sooner has it disappeared

than flowers lose no time in coming out, and about the end of the month the fine blue spring gentian may be found. In the latter part of April the snow melting in most places, renders the means of communication more difficult, but early in May it disappears entirely, and the returning vegetation, with the song of the lark and the arrival of the swallows, proclaims the spring season.

The spring has a freshness unknown in the plains; the rhododendron is not long showing its charming flowers, and the shepherd leaving the plains takes his cattle to the green pasture of the Engadine. In July the rye and barley commence blooming, and harvest follows in September. At the end of that month the cattle are again driven into lower winter quarters, while the swallow once more deserts the valley. Wheat is met with in the high Engadine up to an elevation of about 6000 French feet, or at 2000 feet higher than in the northern parts of Switzerland or in the German mountains. The potatoe is also grown in that valley, and cherries ripen at Sils-Maria.

Besides St Moritz other villages in the Engadine Valley from Zuz to Camfer, including Samaden and Pontresina have become most favourite summer resorts. There is an excellent hotel at the village of Zuz, about an hour and three quarters' walk from Samaden—the hotel “Concordia” which was particularly recommended to me by friends whom I had the pleasure of meeting there last summer. The village of Camfer had also been pressed into service by the English who

could not find room at St Moritz, while Pontresina was overflowing with visitors.

### PONTRESINA,

At an hour's walk from St Moritz, and 5915 feet above the sea, has become a very favourite place for a summer residence, and many prefer it to the other station. Although but a village, the hotels at Pontresina certainly accommodate during the two summer months over a thousand visitors at a time, amongst whom half at least are English. Mr Binet Hentsch, describing Pontresina in 1859, foretold its prosperity. He remarks that "Pontresina is expected to become at no distant future an Interlaken in the Grisons, although expressing a hope such may not be the case, and that the inhabitants will remain faithful to their simple customs and habits. I should also be very sorry to see such health resorts as St Moritz and Pontresina attempt to rival Interlaken, but society wherever it goes will bring its comforts and refinements, and such stations cannot hope to escape the fate of all places which have become popular, not to say fashionable.

The carriage road to Pontresina leaves the main high road to St Moritz at Samaden, and is reached under half an hour's drive. It is built in a somewhat narrow valley, at the bottom of which runs a mountain stream; a wooden bridge leads to the



opposite bank into a charming wood of larches, intermixed with a few pine trees; indeed, forests of larches extend far and wide on the neighbouring hills, and give the landscape a peculiarly imposing and sombre character. A path through this wood is used as the footway to St Moritz, which is reached in an hour's walk only, and of an afternoon the sandy track is literally crowded with English visitors either hurrying to St Moritz for the table d'hôte, or returning to Pontresina with a similar object. Shortly before entering the St Moritz Valley, a small lake, the Statzer See, is passed, which reflects the surrounding trees in its dark-looking waters. This spot is admirably sheltered from the wind, as on every side the eye rests either upon mountains reaching to the very lake side, or on lofty larch trees; and there is little doubt but that an hotel built in this spot would enjoy a thorough immunity against cold draughts. When I was there last August, the westerly wind sweeping over the St Moritz Valley was not felt in the slightest degree in this sheltered place, although it could be heard vainly attempting to force a passage through the adjoining trees.

The village of Pontresina skirts the very foot hills of the Piz Languard, the summit of which is reached in four hours. Its site is extremely picturesque, green slopes, shortly lost in the forest, rising above the village, and the view from these hills well repays the slight trouble required to walk up them a small distance only. It is on the green turf

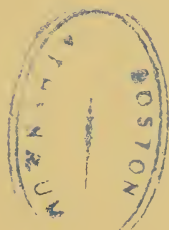
close to the houses that the English church has been erected ; its architecture is most pleasing, and its position within ready access of all the hotels could hardly be improved upon. The church is constructed to hold from 480 to 500 people. I was at Pontresina when it was consecrated on the 19th of August last by the Bishop of Bedford. The church was as full as it could possibly be, and was much admired, especially its beautiful stained windows.

Pontresina faces the opening of the Roseg valley, which extends in a southerly direction ; it is closed, in the distance, by the Glacier de Roseg, the Piz Sella, Glüschaint, and Capuchin, which are objects of very great beauty. Unfortunately the Piz Bernina and some of the lofty summits with which it is surrounded, are not to be seen from Pontresina.

There are several first-class hotels at Pontresina, most of the English community residing either at the Kronenhof or the Hotel Roseg. Between two and three hundred people join at table d'hôte in the middle of the season at each of these hotels, and half at least are English. Dancing is one of the favourite evening amusements, but as the days are usually taken up with some excursion in the neighbourhood, many of the guests are glad to retire early.

Pontresina has more of an Alpine character than St Moritz ; guides are seen going about with knapsack, and rope coiled round their body, while an ice axe is a necessary part of the accoutrement ; like at Chamonix and Zermatt they form into groups here

and there waiting for employment. Few of the visitors, however, are bent on hard climbing, and the proprietors of carriages and horses apparently fare infinitely better than the guides.





From a Photograph

Hanhart lith

THE VALLEY OF DAVOS, AND DAVOS AM PLATZ

## CHAPTER XIV

### THE VALLEY OF DAVOS

IN order to make myself well acquainted with this health resort, which has acquired so much importance within the last few years, I paid the Valley of Davos a visit last summer. It is easily reached from Landquart, a station on the railway from Zurich to Coire. Leaving Zurich at 10 15 a.m. I arrived at Landquart at 2.20, after an interesting journey. The train called at Ragatz, where an English gentleman and lady, the only occupants of the carriage in which I sat, were going to take the waters. Ragatz is, indeed, in much repute for its baths, although the water scarcely contains any solid matter of any kind; they belong to the same class of baths as Wildbad in Wurtemberg, and Gastein in the Tyrol. Ragatz is a favourite resort for people suffering from chronic disorders of the nervous system, especially those affecting the spine. The spring is at Pfeffers in the dark and narrow gorge of the Tamina, and at two miles and a half from Ragatz, to which place the water is conducted through pipes.



On my arrival at Landquart I secured a place on the "banquette" of the diligence, and at 2.50 p.m. we were off for Davos.

As we rode on the weather became very cold although on the 16th of August. Dark clouds were most provokingly hanging over the Prättigau Valley through which we were travelling, and resolved themselves into a steady downpour, which continued uninterruptedly the last three hours. It was pitch dark when the coach commenced descending, at full speed, the Davoser Kulm, and some twenty minutes later we brought up at Davos Dörfli at the entrance of the valley. A few minutes to drop two or three passengers, and we drove to Davos am Platz close by. I took up my quarters at the kurhaus, a large hotel built mostly in view of winter visitors, and that night out of my bedroom window the thermometer was down to  $42.5^{\circ}$ .

The next morning there was snow on the surrounding hills down to about five or six hundred feet above the valley. The day was fairly fine though cloudy, and on walking out my first impression was a feeling of sharpness in the air, as if the breeze had blown over snow.

The floor of the valley is a flat green turf, watered by a narrow river issuing from a small lake. Shortly after leaving the lake the river is fed by two other streams, rushing down from side valleys. It follows that the grass is somewhat swampy in places, and has a damp appearance, but the village and hotels

are built at a little height and on perfectly dry land. I cannot help thinking, however, that the dampness arising from so much water must prove objectionable in summer time. In winter, when all is frozen, and the grass has disappeared under a thick coating of snow, this source of moisture, of course, no longer exists. The valley extends from north-north-east to south-south-west, and is about ten miles in length by a breadth of about half a mile. According to Dufour's map of Switzerland, Davos am Platz is 5105 feet above the sea; Davos Dörfli and the lake are situated at the northern end of the valley, while Davos am Platz is built on its western side at the very foot of the hills. The valley, which is partly open at its northern and southern ends, is sheltered east and west by two chains of mountains, rising to about 1500 feet above Davos, and free from snow in summer, except on a few rare occasions, when it disappears in the course of the day. Beyond the lake there is a low wooded hill, and further on in the same direction another chain of mountains limits the view.

Davos was first brought into notice as a station for consumptive invalids in 1862, by Dr Spengler who was practising in that district, and who published in a German medical periodical a number of observations relating to the immunity against phthisis met with in high Alpine regions. He had ascertained that this affection was unknown or but very seldom met with in that valley, while among the natives of Davos who emigrated to settle down in large towns, mostly as

confectioners, some came home suffering from consumption. He had also observed that these patients recovered very soon after returning to their native valley. The first few consumptive invalids who, tempted by Dr Spengler's paper, resorted to Davos, benefited by the change.

The same year (1862) Dr Meyer Ahrens, a German physician, well known for his writings on mineral waters, also published some remarks, in a journal of hygiene, on the climate of Davos as being suited to consumptive patients. A Saxon physician, Dr Unger, who was suffering from phthisis, happened to meet with this paper, and subsequently repaired to Davos. His health improved from its climate to such an extent that he became one of the principal promoters of its early success. Dr Dufresne, of Geneva, in an interesting pamphlet, from which the above is extracted, states, writing in 1879, that there were at that time at Davos seven first-class hotels, thirty boarding houses, and a few villas, and that seven hundred patients wintered in that health resort.

When at Davos last summer I understood that over a thousand people, mostly invalids, spent the winter 1881-82 at that sanitarium, where they enjoyed a beautiful season.

The bright sun and stillness of the weather in the valley of Davos are conducive to open-air amusements, and walking, sleighing, and skating are the main winter occupations in the daytime. The snow is beaten down on the high road as soon as it ceases

falling, and people can walk out without much fear of wet feet. The valley is nearly flat, though somewhat inclined to the south, doing away with the necessity of going up or down hill while out for a morning stroll; and the stream through the valley allows a large space of flat ground being flooded every evening, which produces a beautiful sheet of clear ice for skating upon the following morning. Those invalids who are not equal to much exercise will find benches where they can sit down under parasols to shelter them from the warm sun.

I had the pleasure of making Dr Ruedi's acquaintance at Davos Platz, who kindly gave me much valuable and interesting information on the influence of its winter climate on phthisis. He remarked that the appetite and digestion are usually better a few days after the invalid's arrival in the valley, and that this satisfactory change coincides in general with a decided improvement in the general state of health. He made no sweeping assertion as to the climate of Davos benefiting all cases of phthisis, and observed that if in the course of two months he failed to notice certain favorable indications as to the health of his patients he sent them back, as a rule, to their homes. He confirmed, however, what experience has now taught, that many consumptive invalids do well at Davos, and may eventually obtain a permanent cure. In answer to my inquiries he insisted on the importance of patients not returning home or to the plains during the summer. They should leave for a lower station in

the spring when the snow is melting, but resort to some high Alpine sanitarium as soon as the warm weather has set in, about the end of June or beginning of July.

The hotels are built in view of a winter sojourn. The kurhaus at Davos am Platz is a large building accommodating perhaps 150 guests; a long and wide corridor on the first floor, joining the drawing-room and dining-room, allows of exercise being taken indoors when the state of the weather prevents going out. The whole building is heated by steam pipes, there being a tap in each bedroom, by means of which the steam can be turned on or off. This arrangement is both safe and convenient; the only objection attending it is the impossibility of regulating the heat. There are double windows everywhere, so that the cold is effectually shut out in winter. Other hotels, such as the Belvédère, have large balconies fully exposed to the south, on which the open air in the sun can be enjoyed without going out of the house.

Summing up the impressions left me from my visit to Davos, I can hardly consider it equal to Pontresina, St Moritz, and the Upper Engadine for a summer resort. This place appeared, indeed, much better suited as a winter station; and although it is said at Davos that there are now a sufficient number of invalids for the accommodation to be met with, I cannot help thinking that applications from winter visitors are likely to continue increasing. Compared with St Moritz, for the winter, Davos is lower by 754 feet, and decidedly better sheltered from the winds. Pontresina is not

unlikely, however, to become a winter resort, as it is well sheltered from the north, and thoroughly exposed to the rays of the sun. The valley is somewhat less open than that of St Moritz.

Great discrimination will be required as to the selection of cases likely to do better at Davos than on the Riviera or any other station of that class. The main point will be to ascertain whether there are any symptoms present of an inflammatory character, and whether the general state of health will allow of sufficient power to react against cold. From the tendency to inflammatory affections known to exist in high Alpine stations, it may be safely concluded that patients liable to symptoms of that description, having, for instance, suffered from pneumonia or pleurisy, or being attacked with bronchitis of an acute form, ought not to be advised to resort to such places as Davos. People suffering from any affection of the heart should be equally careful not to reside in an Alpine station at any time of the year.

Invalids will do well to leave early enough for their winter resort to become acclimatised before the cold weather sets in. The end of August or beginning of September is quite late enough. The winter season commences about the middle of October, when the snow begins to fall (Williams). It is questionable, however, whether the snow actually commences to lay permanently on the ground till between the 10th and 15th of November; its usual depth is from two to four feet.

It is very important for consumptive invalids to



leave the valley before the snow begins to melt, at all events as soon as it has commenced melting, as at that time they usually begin to feel less well. The great difficulty is to know where to advise them to go to, as there is snow melting everywhere in the mountains at that time of the year. Perhaps "Les Avants," above the Lake of Geneva, or Bex, in the Rhône Valley, would be amongst the most suitable places, but of course an invalid's movements after leaving Davos in the spring, should be guided by the state of the snow in the lower Alps.

*Climate of Davos.*—The winter climate of Davos is particularly dry, in a great measure free from winds, and while the sky is not often cloudy and mists are rare, the sun in the daytime is in general remarkably warm. A paper by Dr C. T. Williams gives interesting information on the winter climate at Davos.\* A striking feature of that climate is the very great difference between the temperature in the daytime and at night, observations during the season 1879—80 yielding the following figures :

		Mean maximum in the shade (day).		Mean minimum (night).		Difference.
September	.	60·7°	...	39·6°	...	21·1°
October	.	53·9	...	27·7	...	26·2
November	.	33·4	...	16·5	...	16·9
December	.	28·6	...	5·5	...	16·9
January	.	32·2	...	6·7	...	25·5
February	.	39·6	...	14·9	...	24·7
March	.	48·8	...	20·5	...	28·3
Mean	.	39·4°	...	15·3°	...	22·8°

\* 'Quart. Journ. of the Meteorological Soc.,' 1880.

Hence, while in December, which was the coldest month, the mean highest temperature in the daytime in the shade was  $3\cdot4^{\circ}$  below freezing, the mean lowest temperature at night fell to  $26\cdot5^{\circ}$  below freezing. But what is most remarkable is the temperature of the direct rays of the sun contrasted with the reading of an ordinary thermometer in the shade. In that same month of December, 1879, the black bulb thermometer *in vacuo* yielded a mean maximum reading of  $138^{\circ}$ , while the mean highest temperature in the shade amounted to  $28\cdot6^{\circ}$  or  $3\cdot4^{\circ}$  below freezing. The high temperature of the sun's rays is very remarkable and is clearly seen in the following table, showing the mean highest or maxima readings of the black bulb *in vacuo* for Greenwich, Cannes, and Davos (C. T. Williams).

		Greenwich.		Cannes.		Davos.
November, 1878	. .	$79\cdot9^{\circ}$	...	$122\cdot0^{\circ}$	...	$157\cdot0^{\circ}$
December, 1878	. .	$61\cdot0$	...	$105\cdot0$	...	$147\cdot0$
January, 1879	. .	$63\cdot8$	...	$119\cdot0$	...	$141\cdot0$
February, 1879	. .	$81\cdot4$	...	$121\cdot0$	...	$166\cdot5$

It will now be readily understood that the direct rays of the sun in the daytime at Davos may feel actually too warm to be comfortable, while the air may be freezing in the shade. The perfection of a parasol under such a climate would be one constructed with the proper material to let through a certain amount of the sun's heat, as too perfect a shelter might feel chilly. It is a wonder that the snow does not melt under such a high solar temperature; the explanation, however, is simple enough. The days are short, and as soon as the sun has

set the air becomes intensely cold; the long nights allow the radiation of a considerable amount of heat from the snow, which thereby cools down to a temperature far below freezing. In the daytime the sun's heat falling upon the white snow is, in a great measure, reflected, while the small proportion which is absorbed is insufficient to raise even its surface to the melting point; hence it is that the snow is hard, crisp, and granular under a warm sun, and that ice does not melt.

As already stated, every precaution is taken to keep the hotels warm, so that no fear of suffering from cold indoors need be entertained.

The dryness of the atmosphere is very remarkable, and this is certainly one of the most important features of the climate of Davos in a medical point of view. Writing in October, 1880, Dr Williams observes: "The average percentage of relative humidity for last January was 40." It is true that January, 1880, was cold, fine, and dry at most places in Europe, still a mean of only 40 per cent. of relative humidity is exceedingly low. The humidity of the atmosphere varies greatly at Davos throughout the twenty-four hours, the air being much drier in the middle of the day than in the evening and at night; still in an invalid's dwelling the air continues dry at night on account of the artificially heated air; therefore a person wintering at Davos will live in an exceedingly dry atmosphere day and night until the snow begins to melt in the spring.

The condensed moisture falls nearly always in the form of snow. Invalids do not appear, however, to mind being out in a snowstorm, as, from the very low temperature, the snow does not melt on touching the clothes, and is easily shaken off.

The winds are rare at Davos on account of the sheltered position of the valley. Those most frequent are the north-north-east and south-west; the latter, known as the Föhn, is disliked, as it is often the fore-runner of a change of weather for the worse. Dr Crothers, who has spent several winters at Davos, writes in a letter to the 'British Medical Journal,' dated July, 1880: "The atmosphere at Davos is generally calm, so much so that I have often placed a lighted candle on a table in the middle of a room, or on a step of a room door with the windows open, and the flame has burnt steadily. The stillness enables patients to sit out of doors for hours in the sun and to sleep with open windows, thus allowing them to breathe pure fresh air. The winter climate is characterised by a cold, dry, still, and rarefied air, with intense sunlight, many days without a cloud; the sky a deep blue, darker than that of Italy, probably from contrast with the snow, which reflects the light and makes it very trying to the eyes." This gentleman, who from practising at Nice for several winters, which he has now given up, is well acquainted with the climate of the Riviera, further observes:—"I have formed a favorable opinion of Davos, and believe it will be found of great service to very many invalids; yet the milder

and more equable climates of the South of France are more suitable and agreeable for the greater number of phthisical patients, particularly advanced cases." He also remarks:—"During the past winter (1879—80) I have observed wind on twenty-three days, also the Föhn wind on ten days from November 1st, 1879, to March 31st, 1880. We had continued bright sunshine except for ten or twelve days."

From Dr Williams's paper the total number of days fine, cloudy, and on which rain or snow fell, was as follows from October to March inclusively:

			Fine.		Cloudy.		Rain or snow.
1876-77	.	.	78	...	47	...	57
1877-78	.	.	66	...	39	...	57
1879-80	.	.	110	...	30	...	43

showing the very great preponderance of fine days.

Besides its meteorological features, the pure state and antiseptic character of the air at this winter station is undoubtedly a circumstance which adds to its beneficial influence on consumptive patients; and it is not at all unlikely that the baneful effects of the spring weather and melting snow are owing in a great measure to the air losing more or less of this peculiar property. The beneficial influence on consumption of such a climate as that of Davos may be expected to be met with in other sheltered places on the Alps, at a similar altitude; and by degrees a number of sanatoria of this description will undoubtedly be established. It will ever be a great sacrifice to live away from friends and from those occupations which

help us pleasantly through life, but the consciousness of returning strength, and the hope of resuming one day a mode of existence consistent with health will, I am sure, greatly assist in carrying a patient through a winter season in the high Alps.



## APPENDIX

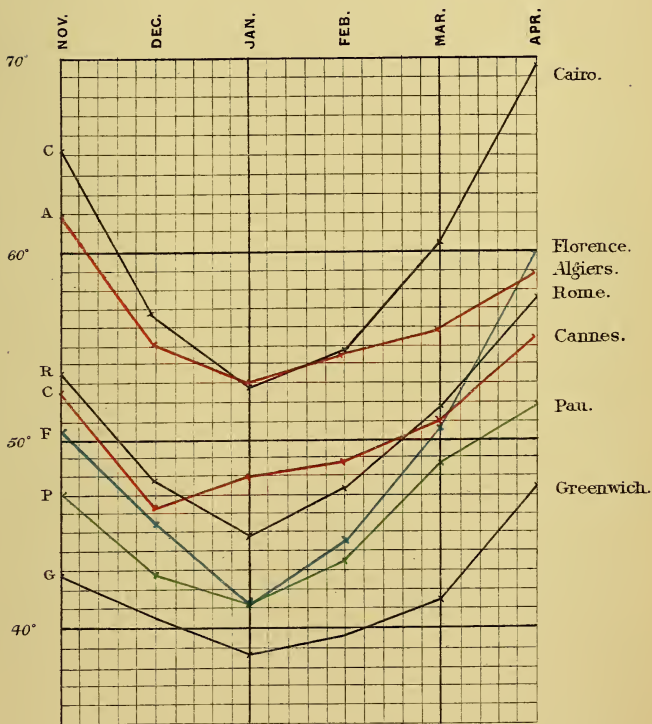
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It will be clearly seen on the accompanying diagram\* how much warmer Cairo is in March and April than any of the other stations, while its temperature approximates that of Algiers in December and February, and is nearly the same in January. The curves for Rome and Cannes follow each other, more or less closely, except in January, when Cannes is decidedly warmer; Florence and Pau may be observed to exhibit the same mean temperature in January, though widely different in April.

The following table, compiled from the records of the "Swiss Meteorological Observations," shows the difference between the climate of the comparatively low mountain stations—Chaumont, St Beatenberg, and Engelberg, which are *summer* resorts. They exhibit nearly the same mean temperature throughout the summer season, and from May to September inclusively this temperature is similar to that of the Riviera during the six *winter* months, or just a trifle

\* I am indebted to Mr Strachan for the preparation of this diagram.

DIAGRAM SHEWING THE MEAN TEMPERATURES AT  
CAIRO, FLORENCE, ALGIERS, ROME, CANNES, PAU & GREENWICH.





# SUMMER STATIONS.

	Five Seasons. CHAUMONT.			Five Seasons. ST. BEATENBERG.			Five Seasons. ENGELBERG.		
	Temp.	Relative humidity.	Rain.	Temp.	Relative humidity.	Rain.	Temp.	Relative humidity.	Rain.
May . . . . .	44·2°	79·4	3·583	45·2°	84·9	6·732	44·8°	79·1	6·654
June . . . . .	54·5°	77·9	4·803	55·2°	82·7	5·906	55·2°	76·8	8·385
July . . . . .	56·7°	78·5	4·606	57·6°	83·0	7·126	56·3°	80·4	10·591
August . . . . .	53·8°	80·1	5·039	58·8°	84·2	5·354	57·2°	82·8	8·307
September . . . . .	50·3°	84·6	3·937	51·5°	86·3	5·039	49·8°	84·6	7·973
	51·9°	80·1	4·393	53·7°	84·2	6·031	52·7°	80·7	8·382
	Mean rainfall for } 43·190 the whole year }			Mean rainfall for } 60·789 the whole year }			Mean rainfall for } 41·339 the whole year }		

Compiled from the records of the Swiss Meteorological Observations.

higher. The relative humidity is greater than might have been anticipated, and this must be owing to the vicinity of a lake, Chaumont receiving moisture from the Lake of Neuchatel, St Beatenberg from the Lake of Thun, and Engelberg from that of Lucerne.

The *yearly* rainfall is observed to be considerably greater at St Beatenberg than either at Chaumont or Engelberg, but during the five summer months which concern us more especially, it is heaviest at Engelberg, with a mean of 8·382 inches per month, and a maximum of 10·5 inches in July.

Chaumont, on the other hand, is comparatively dry, there being a fall of only 4·39 inches of rain throughout the five summer months, equal to little over half the rainfall at Engelberg; the maximum amounts to only 5 inches in August. The rainfall in summer at St Beatenberg is intermediate between that of Chaumont and Engelberg.

The following table for Davos and St Moritz shows that the mean temperature during June, July, August, and September is very nearly the same at both stations, there being only  $2^{\circ}$  ~~inches~~ difference, and it is but slightly below that of the three stations we have just considered. In winter the mean temperature falls to  $23\cdot7^{\circ}$  at Davos, and  $24^{\circ}$  at St Moritz, which is also very nearly the same, although the altitude of St Moritz is greater than that of Davos by 750 feet.

	5 years (1876—1880).				4 years (1876—1879).		
	DAVOS.				ST. MORITZ.		
	Temp.	Mean relative humid.	Relative humid., 1 p.m.	Rain, snow.	Temp.	Mean relative humid.	Relative humid., 1 p.m.
SUMMER SEASON.				Inches.	4 years	3 years.	3 years.
June . . .	51·6°	71·7	55·4	5·079	50·8°	71·9	53·9
July . . .	54·0°	74·1	56·2	5·748	52·3°	69·0	50·6
August . . .	51·0°	77·4	57·0	5·236	54·7°	75·3	55·2
September . . .	46·4°	80·1	59·2	3·366	46·0°	74·5	52·6
Means . . .	50·7°	75·8	56·9	4·857	50·9°	72·7	53·1
WINTER SEASON.							
November . . .	27·7°	80·3	68·1	3·307	26·8°	74·1	60·1
December . . .	21·3°	78·4	67·1	2·737	19·6°	73·4	62·4
January . . .	19·1°	75·2	62·6	2·559	21·6°	65·2	53·0
February . . .	22·6°	78·1	61·4	3·346	25·1°	66·0	49·3
March . . .	27·8°	73·8	56·5	3·661	26·9°	69·7	53·5
Means . . .	23·7°	77·2	63·1	3·122	24·0°	69·7	55·7
Mean rainfall for the whole year at Davos Winter Season . . .				} 43·769			

From the records of the Swiss Meteorological Observations.

The mean relative humidity is greater at Davos than at St Moritz both summer and winter. It is remarkable how low it falls in the middle of the day, especially at St Moritz, where it only registers 53·1 per cent. in summer and 55·7 per cent. in winter. No doubt but that dryness of the atmosphere is one of the main meteorological characters of Davos and St Moritz; and it is considerably below that registered at Chaumont, St Beatenberg, and Engelberg.



The rainfall at Davos is moderate in summer, and the snow throughout the five winter months, reckoned in the form of water, is inconsiderable. As there is a query before some of the observations as to rainfall for St Moritz in the Swiss Meteorological Reports, I have omitted them altogether in this table.

I am favoured by Dr W. B. Oliphant, of Pau, with the following table of mean observations he has made at this station during five seasons, or from 1877 to 1881 inclusive :

*Observations made at Pau by Dr Oliphant*

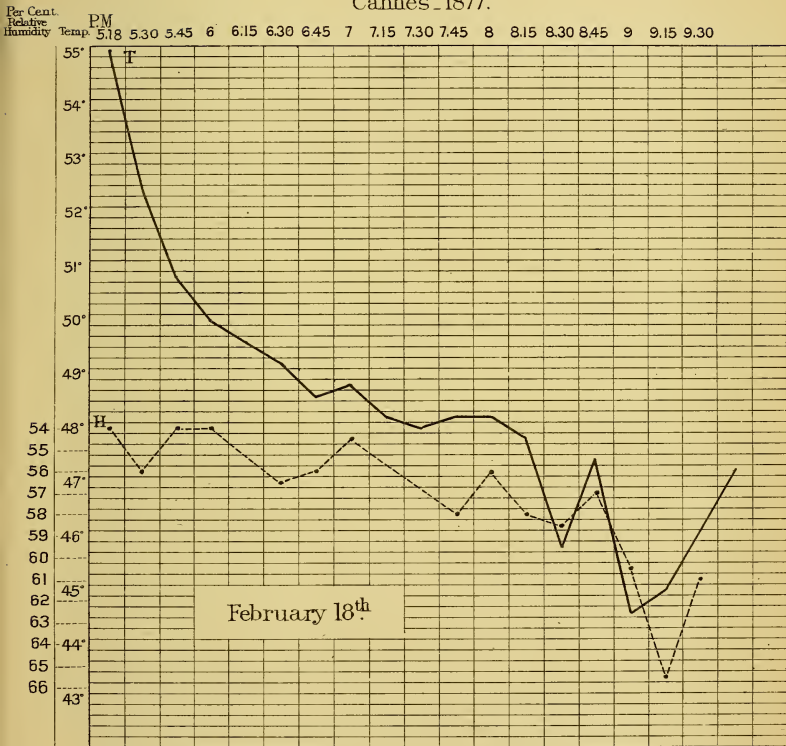
		Minima.		Maxima.		Rain (inches).
January	. .	37·22	...	50·08	...	4·31
February	. .	39·76	...	56·02	...	5·05
March .	. .	40·16	...	60·44	...	3·07
April .	. .	45·42	...	62·28	...	7·81
May .	. .	46·50	...	65·40	...	4·45
June .	. .	53·20	...	75·52	...	5·30
October	. .	47·04	...	67·02	...	2·95
November	. .	39·08	...	54·24	...	3·65
December	. .	33·42	...	50·70	...	4·46

The main point of interest in the above table is the great difference between the mean lowest and highest temperature in each month, showing that the thermometer falls considerably at night, although the air may be quite warm in the daytime.

I shall conclude this appendix with a series of charts showing the observations I made at Cannes on the fall of temperature of the air and increase of atmospheric humidity after sunset. These tracings were originally published in the 'Quarterly Journal of the Meteorological Society' for 1878.

# FALL OF TEMPERATURE AFTER SUNSET.

Cannes-1877.



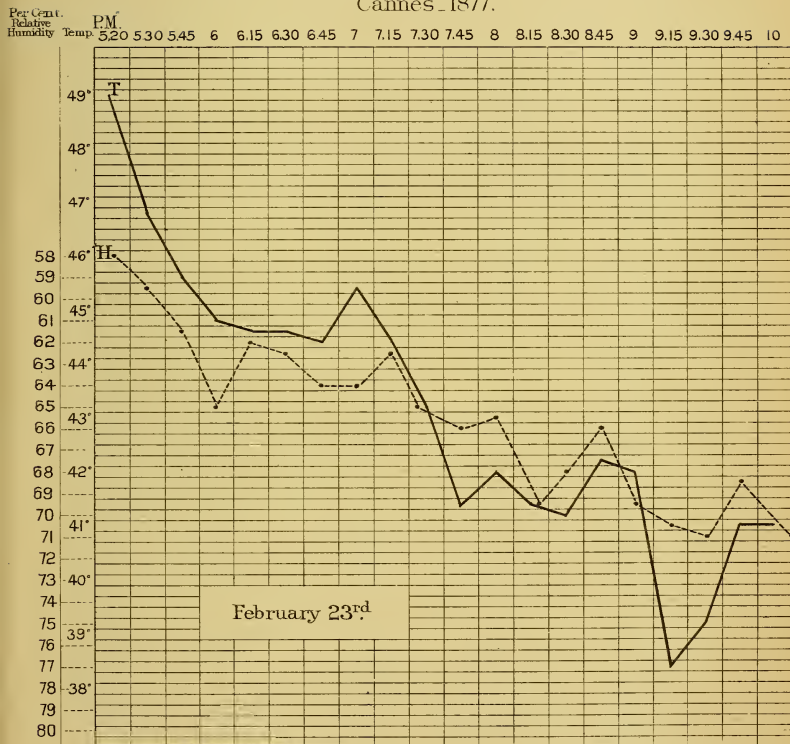
Quart. Journ. Met. Soc. Vol. III. Pl. XIX.

————— TEMPERATURE.  
 - - - - - RELATIVE HUMIDITY.



# FALL OF TEMPERATURE AFTER SUNSET.

Cannes 1877.

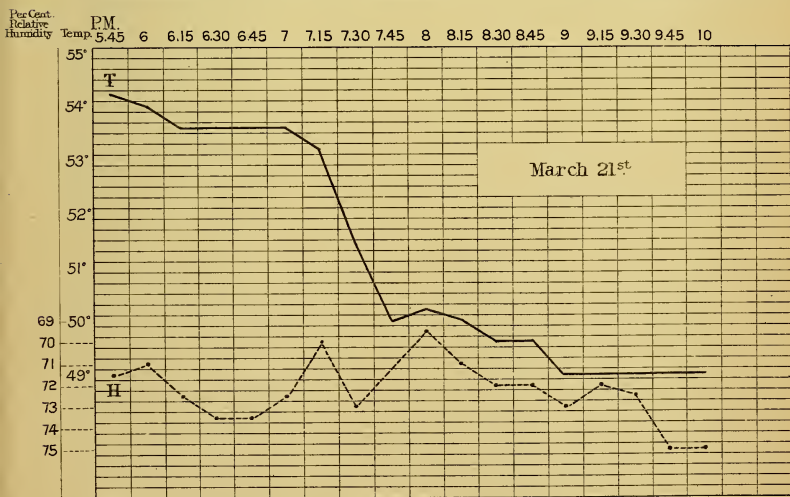
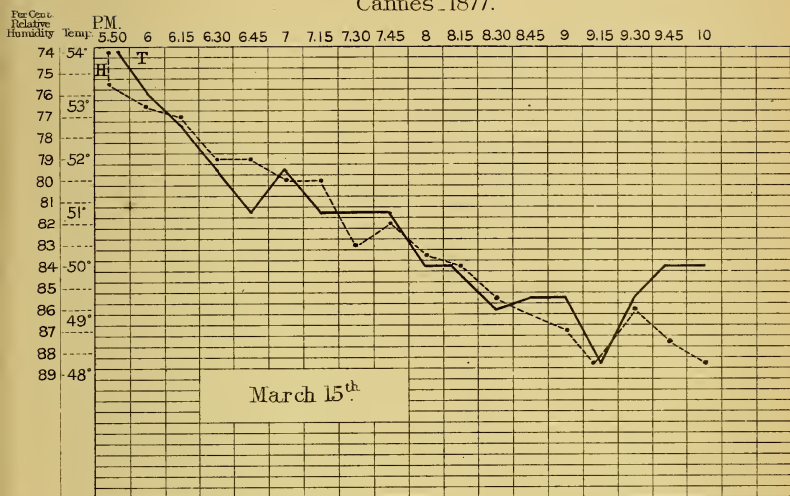


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# FALL OF TEMPERATURE AFTER SUNSET. Cannes 1877.

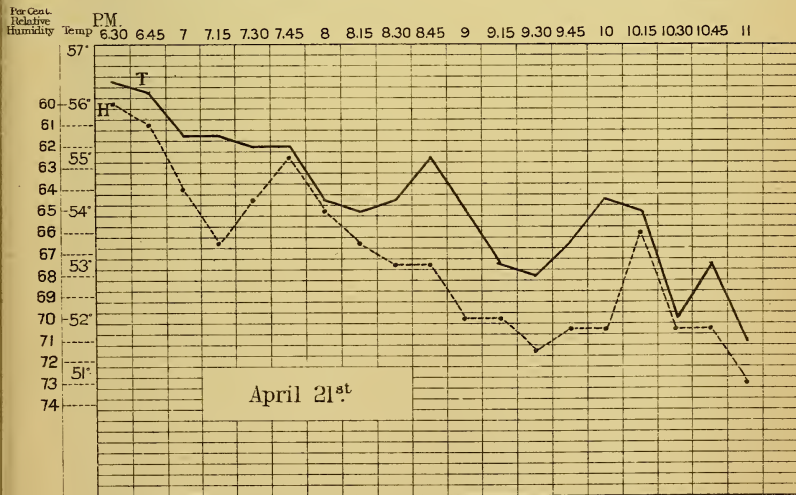
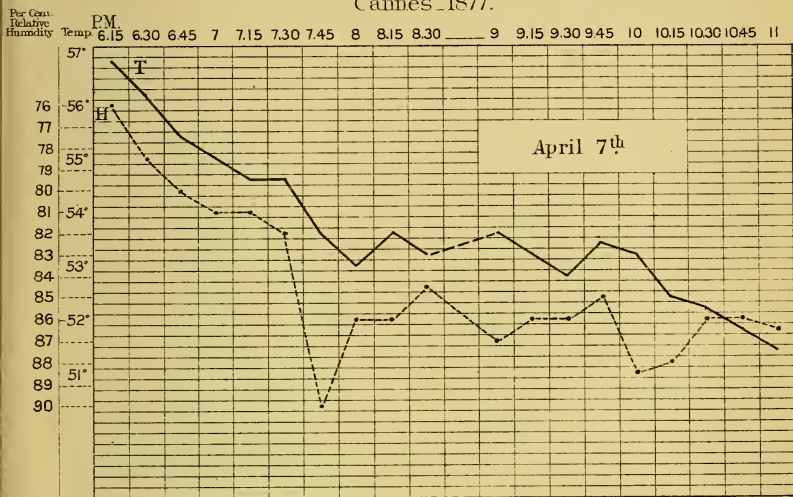






# FALL OF TEMPERATURE AFTER SUNSET.

Cannes 1877.





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